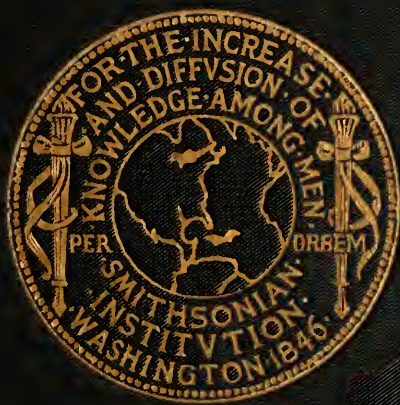




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SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM

BULLETIN 100

VOLUME 10

CONTRIBUTIONS TO THE BIOLOGY OF THE
PHILIPPINE ARCHIPELAGO AND
ADJACENT REGIONS

THE FISHES OF THE FAMILIES AMIIDAE, CHANDIDAE,
DULEIDAE, AND SERRANIDAE, OBTAINED BY THE
UNITED STATES BUREAU OF FISHERIES STEAMER
"ALBATROSS" IN 1907 TO 1910, CHIEFLY IN THE
PHILIPPINE ISLANDS AND ADJACENT SEAS

BY

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Of the United States National Museum



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The scientific publications of the National Museum include two series, known, respectively, as *Proceedings* and *Bulletin*.

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The *Bulletins*, the first of which was issued in 1875, consist of a series of separate publications comprising monographs of large zoological groups and other general systematic treatises (occasionally in several volumes), faunal works, reports of expeditions, catalogues of type-specimens, special collections, and other material of similar nature. The majority of the volumes are octavo in size, but a quarto size has been adopted in a few instances in which large plates were regarded as indispensable. In the *Bulletin* series appear volumes under the heading *Contributions from the United States National Herbarium*, in octavo form, published by the National Museum since 1902, which contain papers relating to the botanical collections of the Museum.

The present work forms No. 100, volume 10, of the *Bulletin* series.

ALEXANDER WETMORE,

Assistant Secretary, Smithsonian Institution.

WASHINGTON, D. C., December —, 1929.

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THE FISHES OF THE FAMILIES AMIIDAE, CHANDIDAE, DULEIDAE, AND SERRANIDAE, OBTAINED BY THE UNITED STATES BUREAU OF FISHERIES STEAMER "ALBATROSS" IN 1907 TO 1910, CHIEFLY IN THE PHILIPPINE ISLANDS AND ADJACENT SEAS

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INTRODUCTION

The present work is the third installment¹ of the report on the fishes collected by the United States Bureau of Fisheries steamer *Albatross* and the first report on the percoid series of fishes collected by the *Albatross* Philippine Expedition of 1907-1909. We have limited it to the more typical perchlike families, of which the Amiidae and Serranidae are far more extensive in both species and series of specimens. Both are likewise most diverse in specific variation with respect to color, while the Serranidae alone are extreme in individual variation. The Chandidae are, on the contrary, the most homogeneous. With this feature in view the senior author has prepared the accompanying illustrations, showing some of the more striking cases where extensive series of specimens permit.

Two valued papers have appeared by Smith and Radcliffe² describing the new Amiidae, most of the species of which we accept.

The names which we propose as new are as follows:

Apogonichthys melanopterus, new name to replace *Amia melas*, Fowler 1918 (not Bleeker 1848).

Sphaeramia, new subgenus. *Amia*.

Ioamia, new subgenus. *Archamia*.

¹ The first and second are volumes 7 and 8, Bulletin 100, U. S. National Museum.

² Proc. U. S. Nat. Mus., vol. 41 (July 15, 1911), pp. 245-261, pls. 20-25; vol. 41, 1911 (Jan. 31, 1912), pp. 431-446, pls. 34-38.

Desmoamia, new subgenus. *Cheilodipterus*.
Whitleyia, new subgenus. *Ambassis*.
Belonopercinae, new subfamily. *Serranidae*.
Belonoperca, new genus.
Belonoperca chabanaudi, new species.
Chorististium swalesi, new species.
Plectropomus truncatus, new species.
Pleuroperca, new subgenus. *Plectropomus*.
Cephalopholis albomarginatus, new species.
Anthias albofasciatus, new species.
Callopleysiops, new genus.
Callopleysiops niveus, new species.
Callopleysiops argus, new species.

The acknowledgments made in the previous installments apply equally to the present one.

Family AMIIDAE

Body oblong or elongate, sometimes compressed and elevated. Head rather large and compressed. Mouth cleft wide. Teeth villiform, in bands in jaws, on vomer and palatines, none on tongue; canines sometimes present. Preopercle with double ridge, edges entire or serrate. Opercular spine little developed. Pseudobranchiae present, usually well developed. Branchiostegals 6 or 7. Pyloric appendages few, when present. Lower pharyngeals separate, with sharp teeth. Scales usually rather large, occasionally small, striated and ctenoid, sometimes cycloid, sometimes deciduous. No axillary ventral scales. Cheeks scaled. Lateral line usually complete and distinct. Dorsals well separated, first with 6 or 7 rather strong spines. Usually no dorsal sheath. Soft dorsal with spine and 7 to 10 rays. Anal short or like soft dorsal, spines usually 2, rarely 3. Ventrals thoracic, with spine and 5 rays.

Small fishes of tropical seas, abundant on coral reefs or in sheltered situations, some in deep water. Many are brilliant in color, often bright red or pink. Some are interesting in the habit of the male carrying the ova and very young in his mouth. Until the present time only a few species were known to use this method, though now we have found this condition more or less general. The male at this season may easily be known by its swollen chin. The ova are carried about packed closely as a dense mass.

ANALYSIS OF THE GENERA

- a*¹. Vent as usual, posterior or not far from front of anal.
*b*¹. Jaws without distinct canine teeth.
*c*¹. AMINAE. Body rather deep; eye moderate to large; preopercle with submarginal ridge; scales mostly large and firm; fins large, high; shore forms.
*d*¹. Anal fin short, usually with 2 spines and 8 rays.
*e*¹. Caudal truncate to rounded, never emarginate.
*f*¹. Dorsals separate.
- g*¹. Lower gill rakers 12 to 14.....Apogonichthys
*g*². Lower gill rakers 25 to 30.....Mionorus
*f*². Dorsals joined basally at intersection; dorsal spines 8.....Neamia
*e*². Caudal emarginate or forked.....Amia
*d*². Anal fin large, with 2 spines and 13 to 16 rays; scales large, about 25; caudal forked.....Archamia
*c*². EPIGONINAE. Body elongated to very slender; eye very large; preopercle without submarginal ridge, broadly rounded; scales small, caducous; fins all small, low; caudal emarginate or forked; deep water forms.....Hynnodus
*b*². CHEILODIPTERINAE. Jaws with canines; lateral line complete; scales large; anal short, rays 8; caudal emarginate.
*h*¹. Preopercle entire; body elongate; dorsal spines 6.....Cheilodipterus
*h*². Preopercle more or less serrate; dorsal spines usually more than 6.
*i*¹. Dorsal spines 9; scales cycloid.....Synagrops
*i*². Dorsal spines 6 or 7.
*j*¹. A silvery lateral gland inferior.....Siphamia
*j*². No silvery lateral gland below.....Amioides
- a*². ACROPOMINAE. Vent advanced, nearer ventral bases than anal origin; jaws with small canines; preopercle entire; anal with 3 spines and 7 rays.....Acropoma

Genus APOGONICHTHYS Bleeker

Apogonichthys BLEEKER, Nat. Tijds. Nederland. Indië, vol. 6, 1854, pp. 312, 321. Type *Apogonichthys perdix* BLEEKER, monotypic.

Pseudamia BLEEKER, Nederland. Tijdschr. Dierk., vol. 2, 1865, p. 284.

Type *Apogon polystigma* BLEEKER, orthotypic.

Fowleria JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 22, 1902 (1903), p. 180. Type *Apogon auritus* VALENCIENNES, orthotypic.

Astrapogon FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 527. Type *Apogonichthys stellatus* COPE, orthotypic.

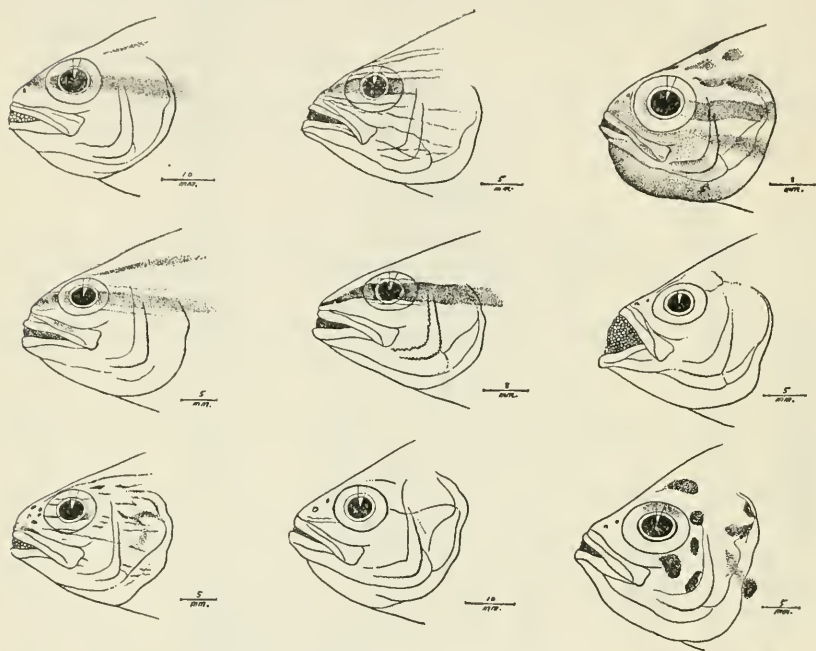


FIGURE 1.—BUCCAL INCUBATION, AMIIDAE:

Amia fusca (Quoy and Gaimard)

Amia hartzfeldii (Bleeker)

Amia multilineata (Bleeker)

Amia cyanosoma (Bleeker)

Amia exostigma Jordan and Seale

Amia fleurieu (Lacépède)

Amia compressa Smith and Radcliffe

Amia hypselonota (Bleeker)

Amia orbicularis (Cuvier)

Profile of head even. Teeth in villiform bands, without canines. Palatines with teeth. Tongue toothless. Preopercle edge and keel usually entire. Gill rakers 10 to 20 on lower branch of first arch. Branchiostegals 7. Scales 18 to 28 in lateral line to caudal base. Lateral line complete. Two separate dorsals, not joined at base, spinous fin with 6 or 7 spines, soft fin with spine and 7 to 9 rays. Anal with 2 spines and 8 to 9 rays. Caudal rounded.

We separate this group from *Amia* chiefly on its rounded caudal as the old distinction founded chiefly on the entire preopercle does not hold.

ANALYSIS OF THE SPECIES

- a¹. FOWLERIA.** Opercle with large round black blotch, sometimes ocellate.
- b¹. Body mottled with darker, often 10 to 11 transverse dark brown streaks; fins not bordered or marked with black-----auritus
- b². Body not mottled with darker, sometimes with 7 transverse dark bands; spinous dorsal tip and soft dorsal and caudal edges usually with broad black borders; soft dorsal and anal with longitudinal median black band-----elliotti
- a². APOGONICHTHYS.** Opercle without black blotch.
- c¹. No longitudinal dark bands.
- d¹. No dark caudal spot.
- e¹. Body with dark transverse bands.
- f¹. Body with 10 vertical dark bands; preopercle ridge entire; few teeth at angle on edge-----striatus
- f². Five ill-defined, dark, transverse bands-----brachygrammus
- f³. Three brown-red transverse bands from spinous dorsal base; band from snout to eye, another from eye to throat, another across nape-----hyalinus
- f⁴. Body mottled with darker brown, sometimes few dark transverse bands; vertical fins often variably mottled darker--perdix
- e². No dark transverse bands.
- g¹. No black spot above pectoral behind gill opening.
- h¹. Front anal edge and lower caudal edges whitish; soft dorsal with obscure dark subbasal longitudinal band. albomarginatus
- h². Anal and caudal edges not whitish.
- i¹. Soft dorsal with large black ocellus; caudal whitish basally, brown terminally-----carinatus
- i². No dorsal ocellus; body uniform brown, vertical fins and ventrals blackish; preopercle ridge entire, edge serrate. melanopterus
- g². Black spot above pectoral, behind gill opening; brown streak from eye to preopercle angle-----uninotatus
- d². Dark caudal spot present; body light brown, finely dotted or spotted minutely darker-----polystigma
- c². Seven rather diffuse longitudinal dark bands; upper half of first dorsal black, second dorsal and caudal with dark edge---glaga

APOGONICHTHYS AURITUS (Valenciennes)

Apogon auritus VALENCIENNES, Hist. Nat. Poiss., vol. 7, 1831, p. 443. Mauritius.—GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 23 (Tahiti and Yap).—DAY, Fishes of India, pt. 1, 1875, p. 63, pl. 17, fig. 2 (Suez, Andamans, Massaua, Zanzibar).—STREETS, Bull. U. S. Nat. Mus., No. 7, 1877, p. 100 (Samoa).—KLUNZINGER, Sitz. Ber. Akad. Wiss. Wien, vol. 80, pt. 1, 1879, p. 344 (Port Darwin).—DAY, Fauna Brit. India, Fishes, vol. 1, 1889, p. 499.—THURSTON, Notes Pearl Fisher. Ceylon, 1890, p. 91 (Tuticorin).—BORSIERI, Ann. Mus. Civ. Stor. Nat. Genova, ser. 3, vol. 1, 1904, p. 191 (Nocera on Daalae Island).—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 10, 1904, p. 544 (Djibouti, Red Sea).—WEBER, Siboga Exped., vol. 57, Fische, 1913, p. 232 (Kwandong Bay, Galawo Straits, West New Guinea; Banda).

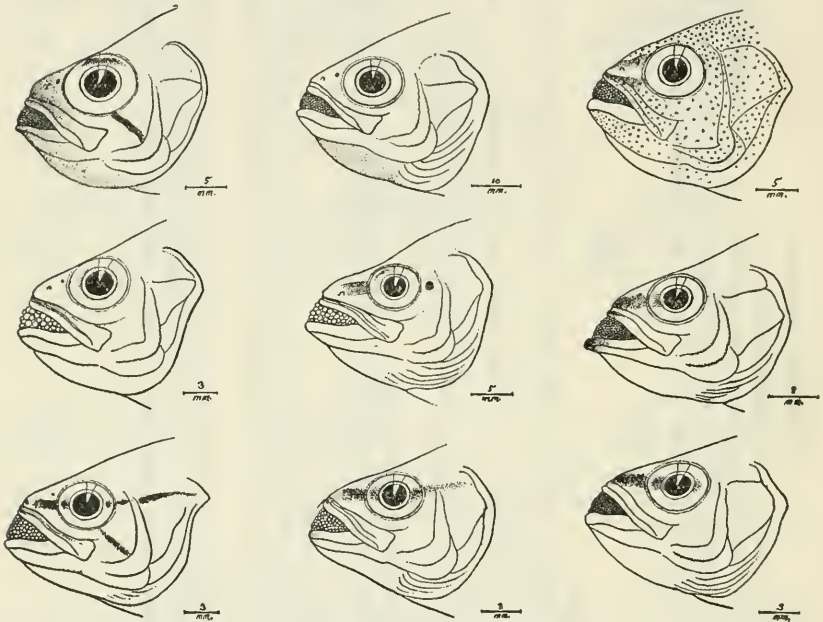


FIGURE 2.—BUCCAL INCUBATION, AMIIDAE:

Amia bandanensis (Bleeker)*Amia griffini* Seale*Amia lineolata* (Cuvier)*Amia novae-guineae* (Valenciennes)*Amia laterale* (Valenciennes)*Amia notata* (Houttuyn)*Amia cypselurus* (Weber)*Archamia gracilis* (Bleeker)*Amia atrogaster* Smith and Radcliffe

Apogon (Apogonichthys) auritus KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 709 (Koseir, Red Sea).—PETERS, Monatsb. Akad. Wiss. Berlin, 1876, p. 436 (Mauritius).—KOSSMANN and RAUBER, Wiss. Ergebn. Reise Küstengeb. Roth. Meers, vol. 1, 1877, p. 7 (Red Sea).—KLUNZINGER, Fische Roth. Meer., 1884, p. 19 (Koseir).—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 416 (Ternate).

Apogonichthys auritus GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 246 (copied).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 21 (Zanzibar).—DAY, Proc. Zool. Soc. London, 1870, p. 682 (Andamans).—OGILBY, Proc. Roy. Soc. Queensland, vol. 21, 1908, p. 24 (Dunk Island and Bells Swamps).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 8 (Guam).—FOWLER and

- BALL, Bishop Mus. Bull., No. 26, 1925, p. 13 (Wake Island).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 163 (Guam, Faté, Wake Island, Samoa, Vavau, Mangareva, Pago Pago, Ascension Island).
- Apogon variegatus* VALENCIENNES, Nouv. Ann. Mus. Hist. Nat. Paris, vol. 1, 1832, p. 55 (Mauritius).—REGAN, Trans. Linn. Soc. London, ser. 2, Zool., vol. 12, 1907, p. 224 (Diego Garcia, Chagos Archipelago).
- Apogonichthys variegatus* JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 250 (Apia and Pago Pago).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 32 (Samoa).
- Apogon punctulatus* RÜPPEL, Neue Wirbelth., Fische, 1835, p. 88, pl. 22, fig. 4. Massaua, Red Sea.
- Apogonichthys marmoratus* ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1877, p. 268, pl. 5, fig. 2. Cape Grenville, Queensland.—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 250, fig. 44 (Pago Pago and Apia).

Depth $2\frac{1}{2}$ to $2\frac{3}{4}$; head $2\frac{1}{2}$ to $2\frac{3}{5}$, width 2 to $2\frac{1}{4}$. Snout $4\frac{1}{4}$ to $4\frac{1}{2}$ in head from snout tip; eye 3 to 4, greater than snout or interorbital; maxillary reaches $\frac{3}{4}$ to opposite hind eye edge, expansion $1\frac{2}{5}$ to $1\frac{2}{3}$ in eye, length 2 to $2\frac{1}{10}$ in head; teeth villiform, in bands in jaws and on vomer but none on palatines; interorbital $4\frac{1}{5}$ to 6, very slightly convex; preopercle ridge and edge entire. Gill rakers 2 + 11, short tubercles or but few lanceolate, less than gill filaments, which $2\frac{1}{4}$ in eye.

Scales 22 in lateral line to caudal base and 3 more on latter; tubular scales 10 or 11 in lateral line, extend till opposite front of soft dorsal, then consist of obscure pores to caudal base, variably complete; 1 or 2 scales above lateral line, 6 below, 5 or 6 predorsal, 3 rows cover cheek. Tubes of lateral line large, well exposed, each with slight basal scale. Scales with 15 to 17 basal radiating striae; 66 to 148 apical denticles, with 4 to 5 transverse series of basal elements; circuli very fine.

D. VII—I, 8, 1, third spine $2\frac{1}{5}$ to $2\frac{1}{3}$ in total head length, second ray $1\frac{4}{5}$ to 2; A. II, 8, 1, second spine 3 to $3\frac{1}{2}$, second ray 2 to $2\frac{1}{5}$; caudal $1\frac{1}{3}$ to $1\frac{2}{5}$, rounded convexly behind; least depth of caudal peduncle $2\frac{1}{8}$ to $2\frac{1}{4}$; pectoral $1\frac{2}{5}$ to $1\frac{3}{5}$; ventral $1\frac{3}{5}$ to $1\frac{3}{4}$.

Brown, ground color but slightly paler below. Body mottled, speckled or blotched with darker, usually pale spot variably resulting on each body scale. Round black blotch on opercle large as pupil, ocellated with narrow pale brown margin. Iris brown, with gray to slate tints. Lips all barred with deeper brown. Fins dull grayish or brownish and except clear pectorals all more or less barred with brown, often with somewhat waved or irregular aspect. Many examples show about 10 or 11 dark transverse brown bands, variably mottled, spotted or speckled, and markings equally variable in areas of cross bands.

Red Sea, Zanzibar, Mauritius, Seychelles, India, Andamans, East Indies, Philippines, Queensland, Micronesia, Polynesia.

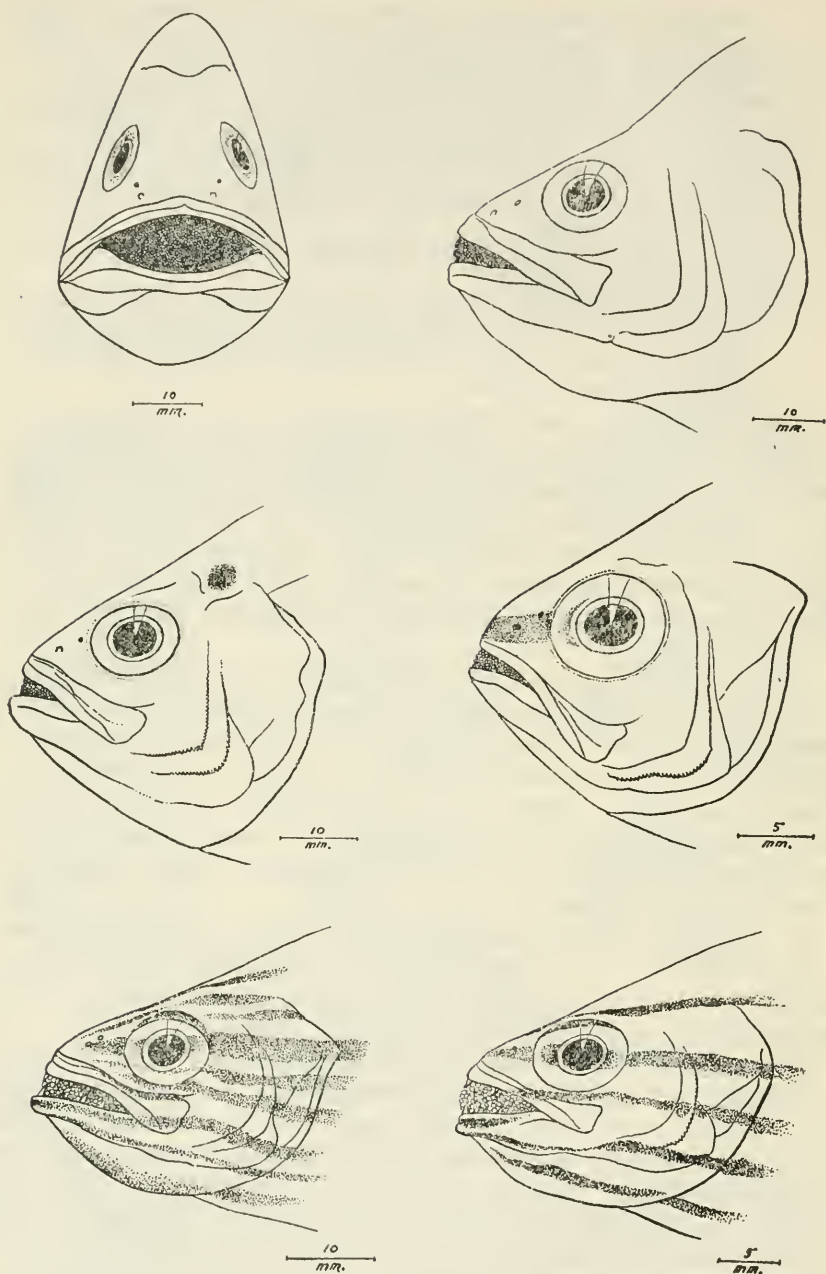


FIGURE 3.—BUCCAL INCUBATION, AMIDAE:

Amia hyalosoma (Bleeker) two uppermost figures
Amia koilomatodon (Bleeker)
Cheilodipterus lineatus (Linnaeus)

Archamia zosterophora (Bleeker)
Cheilodipterus quinquelineatus Cuvier

- One example. Biri Channel. June 1, 1909. Length 47 mm.
16366. Biri Channel. June 14, 1909. Length 45 mm.
- One example. Bolalo Bay, Palawan. December 21, 1908. Length 45 mm.
12098. Capunuyugan Point, Generale Island. May 10, 1908. Length 47 mm.
- Six examples. Cebu market. March 20, 1909. Length 33 to 79 mm. (1406).
- Brown centers of scales darkest, margins with olivaceous shades, paler below.
- Dark blotch on opercle. First dorsal body color, specked darker. Second dorsal orange terminally, with darker specks. Caudal body color, also specked.
- Anal like second dorsal. Pectorals pale pink. Ventrals like first dorsal.
- One example. Galera Bay, Mindanao Island. June 9, 1908. Length 42 mm.
7370. Gigoso Point, Quinapundan Bay, Samar. July 28, 1909. Length 48 mm.
- Six examples. Great Tobea Island. December 15, 1909. Length 20 to 50 mm. (D. 5249). Lauang Point, N. 1 mile. May 16, 1908. Length 35 mm.
- One example. Limbones Cove, Luzon. February 8, 1909. Length 61 mm. (1128). Very dark olive. Black spots on lower side and caudal peduncle.
- Black blotch size of pupil on opercle narrowly margined white. Dorsals, anal and pectorals dusky vermilion, no bars. Caudal similar but darker, tips of outer rays paler.
- Six examples. Mactan Island. August 31, 1909. Length 39 to 73 mm.
- One example. North West Verde Island. July 22, 1908. Length 42 mm.
- One example. Port Dupon, Leyte Island. March 17, 1909. Length 47 mm.
16101. Port Cataingan, Cataingan Bay. May 14, 1909. Length 40 mm.
- Three examples. Port Jamelo, Luzon. July 13, 1908. Length 30 to 40 mm.
- One example. Port Matalvi, Luzon. November 23, 1908. Length 55 mm.
- Three examples. Romblon. March 25, 1908. Length 32 to 42 mm. (441, 442, 443). Black opercular blotch about size of eye, narrow border with golden. Back with opalescent reflection dusky. Narrow brownish bars on middle of side. Fins all vermilion. Another example with short black stripes over blotch. Two short stripes over eye, one across cheek and opercle from lower corner of eye. General color darker and bars on side broader and almost black.
- Three examples. Romblon. March 26, 1908. Length 59 to 69 mm. (468). Black opercular blotch surrounded by narrow yellow lines. General body color purplish umber, centers of scales darker. No traces of transverse dark bars on side of body. Narrow black line above opercular blotch. Obscure paler stripe from lower corner of eye across cheek to opercle. Abdominal region partly silvery. Fins same as body color, soft verticals with more of reddish.
- One example. Sablayan, Mindoro Island. December 12, 1908. Length 43 mm.
14058. Sacol Island, east of Zamboanga. September 9, 1909. Length 54 mm.
- 14753 and 14756. San Jauico Strait. April 13, 1908. Length 62 to 72 mm.
- One example. San Miguel Harbor, Ticao Island. April 21, 1908. Length 62 mm.
- Four examples. Tataan Island, Simulac Island, Sulu Archipelago. February 13, 1908. Length 21 to 49 mm.
- Two examples. Tataan Island. February 19, 1908. Length 33 to 57 mm.
- Eight examples. Tataan Island. February 20, 1908. Length 21 to 43 mm.
- One example. Tilig, Lubang. July 15, 1908. Length 41 mm. (D. 5159). Tinakta Island, Sulu Archipelago. February 21, 1908. Length 41 mm.
8685. Tutu Bay, Jolo. September 19, 1909. Length 39 mm.
22830. Danawan and Si Amil Islands. September 27, 1909. Length 47 mm.
- Two examples. Tifu Island, Bouro Island. December 10, 1909. Length 34 to 39 mm.

One example. Tomahu Island. December 11, 1909. Length 48 mm.

One example. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 38 mm.

12780. Limbe Strait, Celebes. November 10, 1909. Length 60 mm.

One example. Talisse Island, north of Celebes. November 9, 1909. Length 42 mm.

APOGONICHTHYS ELLIOTI (Day)

Apogon ellioti DAY, Fishes of India, pt. 1, 1875, p. 63, pl. 17, fig. 1. Madras; Suppl., 1888, p. 784; Fauna Brit. India, Fishes, vol. 1, 1889, p. 497.—JOHNSTONE, Rep. Ceylon Pearl Fisher., pt. 2, 1904, p. 220 (Galle).

Amia ellioti McCULLOCH, Biol. Res. Endeavour, vol. 3, No. 3, 1915, p. 119 (off Gloucester Head, Queensland, 35 fathoms).

Apogon nigripinnis (not VALENCIENNES) JERDON, Madras Journ. Lit. Sci., 1851, p. 128.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 235 (part).

Apogon arafurae GÜNTHER, Rep. Voy. Challenger, vol. 1, 1880, p. 38, pl. 16, fig. C. Arufura Sea.

Depth 3 to $3\frac{1}{8}$; head $2\frac{1}{3}$ to $2\frac{2}{5}$, width $2\frac{1}{8}$ to $2\frac{2}{5}$. Snout $4\frac{2}{3}$ to 5 in head from snout tip; eye $3\frac{1}{2}$ to 4, greater than snout or interorbital; maxillary reaches $\frac{1}{2}$ to $\frac{2}{3}$ in eye, expansion $1\frac{2}{3}$ to $1\frac{3}{4}$ in eye, length 2 to $2\frac{1}{8}$ in head; teeth fine, villiform, in bands in jaws, on vomer and palatines; interorbital $3\frac{7}{8}$ to $4\frac{1}{2}$, nearly level; preopercle edge and ridge with small uneven serrae. Gill rakers 4 + 11, lanceolate, longer than gill filaments or $2\frac{1}{5}$ in eye.

Scales 23 in lateral line to caudal base and 3 more on latter; 2 or 3 above, 5 below, 4 predorsal, 2 rows of cheek scales to preopercle ridge; muzzle including interorbital, maxillary and suborbitals, naked. Lateral line of rather large tubes, well exposed, each with small basal crimped scale. Scales with 8 to 15 basal radiating striae; 35 to 65 apical denticles, with 1 to 4 transverse series of basal elements; circuli fine.

D. VII-I, 9, 1, fourth spine $2\frac{1}{4}$ to $2\frac{4}{5}$ in total head length, third ray $1\frac{3}{5}$ to $1\frac{3}{4}$; A. II, 8, 1, second spine 3 to $3\frac{2}{3}$, third ray $1\frac{7}{8}$ to $2\frac{1}{5}$; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, convex behind; least depth of caudal peduncle $2\frac{2}{5}$ to $2\frac{2}{3}$; pectoral 2; ventral $1\frac{4}{5}$ to 2.

Pale brown generally, with silvery reflections on side of head and body. Iris silvery white. Fins all pale, spinous dorsal with apical half blackish and soft dorsal with median brown longitudinal band, slightly arched, also soft dorsal edge above brown. Ventral with brownish dusted over anterior half of fin.

India, East Indies, Philippines, Queensland. Some examples show 7 broad gray transverse bands on trunk and tail much wider than interspaces. Others also have the caudal terminally with more or less dusky.

Six examples (D. 5360). Corregidor Light, N. 74° W., 6-9 miles ($14^{\circ} 21' N.$, $120^{\circ} 41' E.$), Manila Bay, Luzon. In 12 fathoms. February 7, 1909. Length 62 to 105 mm.

One example (D. 5131). Island off Panabutan Point, N. 20° E., 0.4 mile, Sulu Sea off western Mindanao. In 27 fathoms. February 6, 1908. Length 65 mm. 4466½ (D. 5235). Nagubat Island, S. 58° W., 7 miles (9° 43' N., 125° 48' 15" E.). Pacific coast, east coast Mindanao. In 44 fathoms. May 9, 1908. Length 120 mm.

Five examples (D. 5442). San Fernando Point Light, N. 39° E., 8.4 miles (16° 30' 36" N., 120° 11' 06" E.), west coast Luzon. In 45 fathoms. May 10, 1909. Length 73 to 112 mm.

Two examples (D. 5480). Taebuc Point, S. 87° W., 17.3 miles (10° 44' 36" N., 125° 19' E.), Leyte. In 62 fathoms. July 29, 1909. Length 82 to 102 mm. (1743). Silvery, with bronze reflections, back darker and lower surface minutely dotted with blackish. Isthmus keel and branchiostegal rays blackish, also edges of preopercle. Iris silvery gray. Tips of dorsals and caudal blackish and blackish medianly through second dorsal. Other fins dusky.

4433 (D. 5161). Tinakta Light, N. 12° W., 1.80 miles (5° 10' 15" N., 119° 53' E.), Tawi Tawi Group, Sulu Archipelago. In 16 fathoms. February 22, 1908. Length 67 mm.

4382 (D. 5257). Utara Point, Bongo Island, N. 88° W., 7.70 miles (7° 22' 12" N., 124° 12' 15" E.), southern Mindanao in eastern Illana Bay. In 28 fathoms. May 22, 1908. Length 84 mm.

4544 (D. 5593). Mount Putri, N. 52° W., 17.2 miles (4° 02' 40" N., 118° 11' 20" E.), vicinity Sibuko Bay, Borneo. In 38 fathoms. September 29, 1909. Length 70 mm.

APOGONICHTHYS STRIATUS (Smith and Radcliffe)

Amia striata SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 437, pl. 35, fig. 1. West coast of Luzon (N. Lat. 16° 30' 36", E. Long. 120° 11' 6" in 45 fathoms).

Depth $2\frac{3}{4}$ to $2\frac{4}{5}$; head $2\frac{1}{5}$ to $2\frac{1}{4}$, width $2\frac{1}{3}$ to $2\frac{3}{5}$. Snout $5\frac{1}{3}$ to $5\frac{3}{4}$ in head from snout tip; eye $3\frac{1}{5}$ to $3\frac{4}{5}$, greater than snout or interorbital; maxillary reaches $\frac{3}{5}$ or till opposite hind eye edge, expansion $1\frac{3}{5}$ to $1\frac{3}{4}$ in eye; teeth villiform, in bands in jaws and small patches on vomer and palatines; interorbital $4\frac{1}{2}$ to 5, slightly convex; narrow jagged infraorbital edge; preopercle ridge entire and edge entire except few short denticles around angle. Gill rakers 4 + 11, lanceolate, much longer than gill filaments or one-half of eye.

Scales 21 or 22 in lateral line to caudal base and 3 or 4 more on latter; 2 above, 5 or 6 below, 4 or 5 predorsal, 2 rows on cheek; head naked, except some large thin scales on cheeks and opercles; scales largely deciduous, tubes in lateral line slender, well exposed and each with small basal scale. Scales with 10 or 11 basal radiating striae; 42 to 63 rather weak apical denticles in 2 or 3 transverse series; circuli moderate.

D. VII-I, 9, I, fourth spine $2\frac{1}{3}$ to $2\frac{3}{4}$ in total head length, second ray $1\frac{2}{3}$ to $1\frac{3}{4}$; A. II, 8, I, second spine $2\frac{2}{5}$ to $3\frac{2}{5}$, second ray $1\frac{3}{4}$ to $2\frac{1}{10}$; caudal $1\frac{2}{5}$ to $1\frac{3}{5}$, rounded behind; least depth of caudal peduncle $2\frac{7}{8}$ to $3\frac{1}{8}$; pectoral $1\frac{2}{3}$ to $1\frac{4}{5}$; ventral $1\frac{7}{8}$ to 2.

Pale brown generally, with silvery gray to whitish below and on sides. Two obscure dull brown bands obliquely across cheek from eye. Ten vertical slightly darker bands than back, each little

narrower than pale interspaces. Iris silvery white, with gray above. Edge of gill opening broadly neutral dusky, with underlaid appearance. Isthmus and chest dusted with dark brown. Spinous dorsal whitish basally, terminal $\frac{2}{3}$ neutral dusky or blackish. Soft dorsal gray brown, with base narrowly pale to whitish. Caudal very pale brownish. Other fins whitish, paired fins with rather broad neutral dusky bases. Some examples show all the fins, excepting the pectorals, neutral dusky terminally.

Known only from the Philippines.

22148. Cebu market. August 28, 1909. Length 59 mm. Male with buccal ova. Four examples (D. 5360). Manila Bay. February 8, 1909. Length 25 to 59 mm.

5378 and 5379. Oton market, Iloilo. March 30, 1908. Length 66 to 69 mm. 4453 (D. 5479). Surigao Strait, Samar. July 29, 1909. Length 58 mm.

Thirteen examples (D. 5442). West coast of Luzon. March 11, 1909. Length 37 to 89 mm. (Type, No. 68403 U. S. N. M.)

One example. West coast Mindanao. February 6, 1908. Length 49 mm. (D. 5131).

APOGONICHTHYS BRACHYGRAMMUS (Jenkins)

Fowleria brachygrammus JENKINS, Bull. U. S. Fish Comm., vol. 22, 1902 (1903), p. 448, fig. 20. Honolulu.—JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), p. 211 (Waikiki and Hilo).—JORDAN and SEALE, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 780, fig. 5.

Foa brachygramma GILBERT, Bull. U. S. Fish Comm., vol. 23, pt. 2, 1903 (1905), p. 617 (off Molokai and between Maui and Lanai in 23 to 73 fathoms).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 526 (Hawaii); Copeia, No. 112, Nov. 20, 1922, p. 83 (Hawaii).

Amia brachygramma FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 162 (Pearl City, Oahu; type of *Fowleria brachygrammus*).

Depth $2\frac{1}{2}$ to $2\frac{3}{5}$; head $2\frac{1}{3}$ to $2\frac{1}{2}$, width $2\frac{1}{8}$ to $2\frac{1}{4}$. Snout 4 to $4\frac{3}{4}$ in head from snout tip; eye $3\frac{1}{5}$ to $3\frac{1}{2}$, greater than snout or interorbital; maxillary reaches opposite hind eye edge, expansion $1\frac{3}{4}$ to $1\frac{4}{5}$, length $1\frac{7}{8}$ to 2 in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $4\frac{1}{3}$ to $4\frac{3}{4}$, nearly level; preopercle edge and ridge entire. Gill rakers 2 + 10 or 11, lanceolate, $2\frac{1}{2}$ in eye.

Scales 9 tubes in upper section of lateral line, 8 to 12 pores in lower section to caudal base and two more on latter; one scale above lateral line, 5 or 6 below, 4 or 5 predorsal, 2 rows on cheek. Scales with 9 basal radiating striae; 80 to 136 apical denticles with 4 transverse series of basal elements; circuli fine.

D. VIII, I, 9, I, third spine $1\frac{2}{3}$ to $1\frac{4}{5}$ in total head length, first ray $1\frac{3}{5}$ to $2\frac{1}{8}$; A. II, 8, I, second spine $3\frac{1}{8}$ to $3\frac{1}{3}$, second ray $1\frac{7}{8}$ to 2; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, rounded; least depth of caudal peduncle $2\frac{2}{5}$ to $2\frac{2}{3}$; pectoral $1\frac{3}{4}$ to $1\frac{4}{5}$; ventral $1\frac{3}{4}$ to $1\frac{4}{5}$.

Uniformly brown, in life with 5 dark vertical bands, each narrower than pale interspaces, less distinct with age. Iris pale. Fins all paler. Spinous dorsal and ventral dusky.

Philippines, Formosa, Hawaii. The above description from a series of Hawaiian examples in the Academy of Natural Sciences of Philadelphia.

One example. Danawan and Si Amil Islands, Borneo. September 27, 1909. Length 55 mm.

APOGONICHTHYS HYALINUS (Smith and Radcliffe)

Amia hyalina SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 433, pl. 36, fig. 3. Talisse Island, north of Celebes.

Depth $2\frac{1}{5}$ to $2\frac{1}{4}$; head $2\frac{1}{3}$ to $2\frac{2}{5}$; width $2\frac{1}{2}$ to $2\frac{3}{5}$. Snout 4 to $4\frac{1}{4}$ in head; eye $3\frac{1}{2}$ to $3\frac{3}{4}$, slightly greater than snout or interorbital; maxillary reaches opposite hind eye edge, expansion $1\frac{2}{3}$ to $1\frac{3}{4}$, length $1\frac{7}{8}$ to 2 in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $4\frac{7}{8}$ to 5, nearly level; preopercle ridge and edge entire. Gill rakers 4 + 12, lanceolate, little longer than gill filaments or $2\frac{1}{2}$ in eye.

Scales 20 in median lateral series from suprascapula to caudal base and 2 or 3 more on latter; 7 or 8 tubular scales in short lateral line which about reaches front of second dorsal; 1 scale above lateral line, 6 below, 3 predorsal, 3 rows on cheek; head naked, except cheeks and opercles. Scales with 14 basal radiating striae; 50 to 75 apical denticles; circuli moderate.

D. VII-I, 8, 1, third spine $1\frac{7}{8}$ to 2 in head, third ray $1\frac{2}{3}$ to $1\frac{3}{4}$; A. II, 8, 1, second spine $2\frac{7}{8}$ to $3\frac{1}{4}$, second ray $1\frac{7}{8}$ to 2; caudal $1\frac{1}{4}$ to $1\frac{2}{5}$, convex behind; least depth of caudal peduncle $2\frac{1}{5}$ to $2\frac{1}{2}$; pectoral $1\frac{1}{3}$ to $1\frac{3}{5}$; ventral $1\frac{2}{3}$ to $1\frac{4}{5}$.

Uniform pale brown, fins all lighter or whitish. Pale brownish band, little darker than general color, from snout to eye and then over upper postocular to suprascapula. Brown band obscurely from lower eye edge down over front of cheek close behind maxillary. Another band, though silvery white, parallels close behind. Two or three transverse obscure brown bands down from spinous dorsal base, first usually inclined forward or on to opercle. Iris silvery white.

Known only from the materials in the U. S. National Museum.

One example. Parang, southern Mindanao. May 23, 1908. (638.) 2031. Talisse Island, north of Celebes. November 9, 1909. Length 35 to 47 mm. (2031.) (Type No. 70245 U. S. N. M. and 10 paratypes.) Color hyaline pearl. Brownish red stripe from snout to eye, another from eye to throat, another across nape and 3 downward from spinous dorsal base, latter more or less olivaceous. Abdominal regions and lower side of head with more or less silver. Iris very pale pink. Spinous dorsal mottled finely with brownish, other fins immaculate.

APOGONICHTHYS PERDIX Bleeker

Apogonichthys perdix BLEEKER, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. 321. Lantuka, Flores.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 247 (copied).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7,

1873-76, pl. (44) 322, fig. 2 (Flores and Buru).—FOWLER, Bishop Mus. Bull., vol. 22, 1925, p. 8 (Guam); Mem. Bishop Mus., vol. 10, 1928, p. 163 (Guam).

Amia perdix BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 100 (Flores and Buru).

Apogon perdix WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 230 (Biaru Island and Nusa Laut).

Apogonichthys waikiki JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 22, 1902 (April 11, 1903), p. 179. Waikiki, Oahu, Hawaiian Islands; vol. 25, pt. 1, 1903 (1905), pl. 35a (type).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 162 (Guam; Arhno; type of *Apogonichthys waikiki*).

Mionorus waikiki JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 25, pt. 1, 1903 (1905), p. 210 (type).

Foa fo JORDAN and SEALE, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 779. Negros and Cavite; Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 248, fig. 42 (Apia, Samoa and Philippines); vol. 26, 1906 (1907), p. 17 (Cavite).

Apogonichthys fo JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 255 (Iloilo); Mem. Carnegie Mus., vol. 6, No. 4, 1909, p. 181 (Takao, Formosa).

Foa vaiulae JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 249, fig. 43. Apia Samoa.

Amia vaiulae FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 162 (Suva).

Amia brachygramma (not JENKINS) FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 162 (part).

Depth $2\frac{1}{4}$ to $2\frac{1}{3}$; head $2\frac{1}{3}$ to $2\frac{1}{4}$, width $1\frac{7}{8}$ to $2\frac{1}{8}$. Snout $3\frac{7}{8}$ to 4 in head from snout tip; eye $3\frac{1}{10}$ to $3\frac{1}{3}$, greater than snout or interorbital; maxillary reaches hind eye edge or slightly beyond, expansion $1\frac{3}{5}$ to $1\frac{3}{4}$ in eye, length $1\frac{3}{5}$ to $1\frac{2}{3}$ in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital 4 to $4\frac{1}{4}$, nearly level; preopercle edge and ridge entire. Gill rakers 4+10, lanceolate, upper and lowermost 3 or 4 low rudiments, slightly longer than gill filaments or $2\frac{1}{2}$ in eye.

Scales 18 or 19 in lateral line to caudal base and 2 or 3 more on latter; anteriorly lateral line of only 8 or 9 tubes, not extending beyond soft dorsal; 1 scale above lateral line, 6 below, cheek with 2 rows of scales; scales on middle of side all narrowly imbricated. Scales with 8 basal radiating striae; 45 to 69 apical denticles, with 1 or 2 transverse series of basal elements; circuli fine.

D. VII-I, 9, 1, third spine 2 to $2\frac{1}{5}$ in total head length, third ray $1\frac{2}{3}$ to 2; A. II, 8, 1, second spine $3\frac{1}{2}$ to 4, second ray $1\frac{7}{8}$ to 2; caudal $1\frac{5}{8}$ to $1\frac{7}{8}$, slightly rounded behind; least depth of caudal peduncle $2\frac{1}{2}$ to $2\frac{4}{5}$; pectoral $1\frac{2}{3}$ to $1\frac{4}{5}$; ventral $1\frac{2}{3}$ to $1\frac{4}{5}$.

Light brown, much paler on under surface of head and abdomen. Most everywhere mottled or dusted with darker brown. Obscure dark postocular streak from eye toward pectoral base. Many examples variably show dark transverse bands, as one from front of spinous dorsal, one from middle of spinous dorsal base, one from front of soft dorsal, one from last dorsal rays and one at caudal base, though all obscurely defined. Iris silvery white to grayish.

Spinous dorsal neutral dusky. Soft dorsal, caudal and anal pale, mottled with brownish, which more or less forms waved lines or irregular bars in many examples. Pectorals pale, clear. Ventrals pale basally and on spine, often variable brown bars and terminally neutral dusky.

There seems to be little excuse to us for the erection of the nominal *Apogonichthys waikiki*, *Foa fo*, and *Foa vaiulae*. An examination and comparison of the types shows that all three are the same species. Although there are some slight differences in Bleeker's figure of *Apogonichthys perdix* there is but little doubt that it is the same species, which is widely distributed over the Indo-Pacific. Bleeker shows three rows of scales on the cheek, likely an error of his artist. The figures of *Foa fo* and *Foa vaiulae* fail to indicate any scales on the cheek though the types both show the scale pockets distinctly. As for the description of the color and its resulting patterns, we believe them all to be due to preservation or variously intensified or rendered pallid, according to the condition of the specimens as they were collected.

One example. Alimango Bay, Burias Island. March 5, 1909. Length 37 mm.

Two examples. Canmahala Bay, Luzon. March 11, 1909. Length 24 to 30 mm. (1326). Olivaceous with mottling of paler on sides. Head rather brownish above. Bright dusky stripe behind eye to pectoral, not quite reaching opercular edge. First dorsal brownish, edge paler. Other vertical fins pale, speckled with reddish. Pectorals pale pink. Ventrals dark on terminal portions.

22400. Canmahala Bay. March 11, 1909. Length 37 mm.

One example. Cataingan Bay, Masbate Island. April 18, 1908. Length 35 mm.

One example. Cebu market. August 28, 1909. Length 42 mm.

Eighty-four examples. Cotabato, below mouth of Mindanao River, Mindanao.

May 20, 1908. Length 28 to 47 mm.

24083. Cotabato. May 20, 1908. Length 33 mm.

Three examples. Davao, Mindanao. May 16, 1908. Length 33 to 43 mm.

One example. Gigantaugan Island. March 5, 1909. Length 32 mm.

4930. Iloilo market. March 29, 1908. Length 45 mm.

One example. Mati, Pujada Bay, Mindanao, May 15, 1908. Length 27 mm.

Five examples. Nasipit, Mindanao. August 1, 1909. Length 15 to 35 mm.

One example. San Miguel Harbor, Ticao Island. April 2, 1908. Length 29 mm.

One example. San Pascual, Burias Island. March 8, 1909. Length 27 mm.

One example. Santa Cruz Island, Marinduque. April 24, 1908. Length 36 mm.

One example. Tilig, Lubang. July 14, 1908. Length 36 mm.

(D. 5595.) Zamboanga. October 7, 1909. Length 13 to 14 mm.

[2083.] Powati Harbor, Makyan Island. November 28, 1909. Length 43 mm.

One example. Tomahu Island. December 11, 1909. Length 16 mm.

50639 U.S.N.M. Honolulu, Hawaiian Islands. Bureau of Fisheries. Length 37 mm. Type of *Apogonichthys waikiki*.

51734 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 30 mm. Type of *Foa vaiulae*.

51735 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 32 mm. Type of *Foa fo*.

APOGONICHTHYS ALBOMARGINATUS (Smith and Radcliffe)

Amia albomarginata SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 438, pl. 35, fig. 2. Cavite, Luzon.

Depth $2\frac{3}{5}$ to $2\frac{4}{5}$; head $2\frac{1}{3}$ to $2\frac{2}{3}$, width $2\frac{1}{4}$ to $2\frac{1}{3}$. Snout $4\frac{1}{2}$ to 5 in head from snout tip; eye $3\frac{1}{3}$ to $3\frac{2}{3}$, greater than snout or interorbital; maxillary $1\frac{7}{8}$ to 2 in head, reaches $\frac{2}{3}$ to $\frac{3}{4}$ in eye, expansion $1\frac{2}{3}$ to $1\frac{7}{8}$; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $4\frac{3}{4}$ to 5 in head, slightly convex; preopercle ridge and edge entire. Gill rakers 3 + 10, lanceolate, greatly longer than gill filaments or $1\frac{1}{2}$ in eye.

Scales 23 in lateral line to caudal base and 2 or 3 more on latter; 2 above, 7 below, 5 predorsal, 2 rows on cheek; head naked, except cheeks and opercles. Tubes in lateral line all simple, large, well exposed, and each with small basal scale. Scales with 12 basal radiating striae; 76 to 83 apical denticles, with 7 or 8 transverse series; circuli fine.

D. VII-I, 9, 1, fourth spine $2\frac{2}{5}$ to $2\frac{2}{3}$ in total head length, second ray $1\frac{1}{2}$ to $1\frac{3}{4}$; A. II, 8, 1, second spine $3\frac{1}{4}$ to $3\frac{2}{5}$, second ray $1\frac{7}{8}$ to 2; caudal $1\frac{1}{3}$ to $1\frac{2}{3}$, hind edge convex; least depth of caudal peduncle $2\frac{1}{8}$ to $2\frac{1}{2}$; pectoral $1\frac{3}{5}$ to $1\frac{2}{3}$; ventral $1\frac{1}{2}$ to $1\frac{7}{8}$.

Brown above, lighter below. Head sprinkled with dull or obscure brownish specks or dots, very numerous on mandible anteriorly and on cheek, but few on opercle above. Iris whitish, with gray above. Dorsals and caudal pale brownish. Soft dorsal with obscure darker subbasal longitudinal band or line. Anal light brown, though its front edge narrowly and also that of caudal below, whitish. Paired fins pale.

Known only from the Philippines.

12825. Cavite and San Roque markets. June 27, 1908. Length 75 mm.

12830. Cavite and San Roque markets. June 27, 1908. Length 101 mm. (Type, No. 68402, U.S.N.M.)

5972. Cavite market. December 1, 1908. Length 82 mm.

20556 and 20557. Subig market, Tilig. July 14, 1908. Length 67 to 71 mm. One example. Subig Bay. January 7, 1908. Length 58 mm.

APOGONICHTHYS CARINATUS (Cuvier)

Apogon carinatus CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 157. Japan.—SCHLEGEL, Fauna Japon., Poiss., pt. 1, 1842, p. 3 (Nagasaki).—RICHARDSON, Ichth. China, Japan, 1846, p. 221 (copied).—NYSTRÖM, Svensk. Vet. Akad. Handl., 1887, p. 8 (Nagasaki).

Apogonichthys carinatus BLEEKER, Verh. Batav. Genootsch., No. 4, vol. 26, 1857, p. 56, pl. 1, fig. 3 (Nagasaki).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1870, p. 247 (copied).—ELERA, Cat. Fauna Filip., 1895, p. 471 (Luzon).—JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 892, fig. 1 (Misaki, Wakanoura, Nagasaki).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 412 (Shimizu).—JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 230 (Wakanoura, Toba, Kochi, Misaki).

Depth 3; head $2\frac{2}{5}$, width $2\frac{1}{5}$. Snout $5\frac{3}{5}$ in head from snout tip; eye 4, greater than snout or interorbital; maxillary reaches $\frac{4}{5}$ in eye, expansion $1\frac{1}{5}$ in eye, length 2 in head; teeth minute, in bands in jaws and on vomer, small patch on each palatine; interorbital $4\frac{1}{4}$, level; preorbital edge, preopercle ridge and edge, entire. Gill rakers $3+11$, lanceolate, greatly longer than gill filaments or $1\frac{1}{5}$ in eye.

Scales 22 in lateral line to caudal base and 4 more on latter; 2 above, 6 below, 2 predorsal, 1 row on cheek; head naked, except few scales on cheek and opercle. Tubes in lateral line rather large, well exposed, each with large basal scale. Scales with 19 or 21 basal radiating striae; 67 to 72 apical denticles, with 6 or 7 transverse series of spines; circuli very fine.

D. VII-I, 9, 1, fourth spine $2\frac{3}{4}$ in total head, fourth ray $1\frac{1}{5}$; A. II, 8, 1, second spine 4, third ray 2; caudal $1\frac{2}{5}$, convex behind; least depth of caudal peduncle $2\frac{2}{3}$; pectoral $1\frac{2}{3}$; ventral $1\frac{2}{3}$.

Light brown, inclining to whitish below. Dorsals pale brown, whitish basally and soft fin with basal blackish ocellus large as eye margined with whitish at last rays. Caudal whitish basally, brown terminally. Other fins whitish. Iris whitish, gray above.

Philippines, Japan.

3009 (D. 5376). Tayabas Light, Marinduque Island. March 2, 1909. Length 128 mm. (1183.) Pearl gray, mottled with olive in areas tending to form longitudinal lines. Upper parts with coppery reflections generally. Lower surface of body white. Chin dusky. First dorsal dusky olivaceous and small white spots on basal portions of membranes. Second dorsal yellowish olive; large black white-rimmed ocellus basally posterior; few white spots on anterior and median portions of membranes; fin rays tipped dusky. Anal brassy yellow, white terminally and irregular small white blotches along body of fin. Caudal dusky, tips darkest.

APOGONICHTHYS MELANOPTERUS,¹ new name

Amia melas (not BLEEKER 1848) FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1918, p. 17, fig. 8. Philippines.

Amia nigricans (not DAY) FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 274 (type of *Amia melas* FOWLER); Mem. Bishop Mus., vol. 10, 1928, p. 156, fig. 38 (same specimen).

Depth $2\frac{2}{3}$; head $2\frac{2}{5}$, width $2\frac{1}{8}$. Snout $3\frac{1}{2}$ in head from snout tip; eye $2\frac{2}{3}$, greater than snout or interorbital; maxillary reaches opposite eye center, expansion $2\frac{1}{2}$ in eye, length $2\frac{1}{2}$ in head from snout tip; teeth villiform, in moderately wide bands in jaws, and narrow band on vomer and palatines; interorbital $3\frac{1}{2}$, slightly convex; preopercle ridge entire, hind edge minutely serrate. Gill rakers $5+15$, lanceolate, twice gill filaments or $\frac{1}{2}$ of eye; 4 above and 4 below rudimentary.

Scales 21 in lateral line to caudal base and 4 more on latter; 2? above, 6? below, 3 predorsal, 2 rows across cheek. Lateral line

¹ μέλας, black; πτερον, fin; with reference to the black verticals and ventrals.

concurrent with dorsal profile. Scales with 13 basal radiating striae; apical denticles 38; circuli very fine.

D. VII-I, 9, 1, fourth spine $2\frac{1}{8}$ in total head length, second ray $1\frac{1}{2}$; A. II, 8, 1, second spine $1\frac{7}{8}$, fourth ray $1\frac{2}{3}$; caudal $1\frac{1}{4}$, convex; least depth of caudal peduncle $2\frac{3}{5}$; pectoral $1\frac{2}{3}$; ventral $1\frac{1}{2}$.

Dark brown generally. Pectoral pale brown, other fins uniformly blackish brown.

India, Philippines. We have only seen the example reported by Fowler, redescribed above.

Diagnosis.—Differs from *Apogonichthys carinatus* chiefly in its uniform brown coloration with blackish fins.

47491 A.N.S.P. Philippines. Length 55 mm. Type of *Amia melas* Fowler.

APOGONICHTHYS UNINOTATUS (Smith and Radcliffe)

Amia uninotata SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 436, pl. 34, fig. 3. Bisucay Island and Tara Island, Philippines.

Amia ocellata (not WEBER) VON BONDE, Fisher. Mar. Surv. South Africa, Spec. Rep. No. 1, 1923, p. 14, pl. 1, fig. 2. Natal coast, 27 fathoms.

Apogon duops BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 522 (on VON BONDE).

Depth $2\frac{1}{2}$ to $2\frac{3}{5}$; head $2\frac{1}{3}$ to $2\frac{1}{2}$, width 2 to $2\frac{1}{10}$. Snout $4\frac{1}{8}$ to $4\frac{2}{5}$ in head from snout tip; eye $3\frac{1}{10}$ to $3\frac{1}{2}$, longer than snout or interorbital; maxillary reaches $\frac{3}{4}$ to $\frac{4}{5}$ in eye, expansion $1\frac{7}{8}$, length $1\frac{7}{8}$ to 2 in head; teeth villiform, in bands in jaws and on vomer, none on palatines; interorbital $4\frac{1}{2}$ to $4\frac{2}{3}$, nearly level; preopercle ridge and edge entire. Gill rakers 6 + 15, lanceolate, equal gill filaments or $2\frac{2}{3}$ in eye.

Scales 21 or 22 in lateral line and 3 more on latter; 2 above, 6 below, 4 or 5 predorsal, 2 rows on cheek; head naked, except cheeks and opercles. Tubes in lateral line large, well exposed, each with well-developed basal scale. Scales with 13 to 16 basal radiating striae; 84 to 115 apical denticles, with 1 or 2 transverse series of basal elements; circuli fine.

D. VII-I, 9, 1, third spine $1\frac{7}{8}$ to 2 in total head length, second ray $1\frac{7}{8}$ to $2\frac{1}{3}$; A. II, 8, 1, second spine $2\frac{7}{8}$ to 3, second ray 2 to $2\frac{1}{10}$; caudal $1\frac{1}{2}$ to $1\frac{4}{5}$, convex behind; least depth of caudal peduncle $2\frac{1}{3}$ to $2\frac{2}{3}$; pectoral $1\frac{3}{4}$ to $1\frac{4}{5}$; ventral $1\frac{3}{5}$ to $1\frac{4}{5}$.

Brown generally, not paler below. Round neutral black blotch above pectoral and close behind head, smaller than eye though little larger than pupil. Brown streak from lower hind eye edge down toward preopercle angle. Iris slaty. Vertical fins all dusky to blackish brown, hind caudal edge pale. Pectorals brown, ventrals dusky or blackish. Smaller examples all with fins much paler. All show pale underlaid narrow line sloping down from humeral region across large dark post-humeral blotch and back over tail till midway along median body axis. Small examples with pale iris.

Natal, Philippines.

17032. Bisucay Island, Cuyos Islands. April 9, 1909. Length 55 mm. (Type No. 70248 U.S.N.M.)

One example. Candaraman Island, Balabac. January 4, 1909. Length 45 mm.

One example (D. 5179). Romblon vicinity. March 25, 1908. Length 39 mm.

24015 (788). Tara Island, Mindoro Strait. December 15, 1908. Length 55 mm. Dusky, with reddish-brown shades. Round blackish blotch larger than pupil, midway between pectoral and lateral line.

APOGONICHTHYS POLYSTIGMA Bleeker

Apogonichthys polystigma BLEEKER, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. 484. Wahai, Ceram; Priaman, Sumatra.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 246 (copied).—PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 256 (Pulobrani, Singapore).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Singapore).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 13 (Cebu).—BEAUFORT, Bijl. Dierk., Amsterdam, 1913, p. 115 (Amboina).

Pseudamia polystigma BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 107 (Amboina); vol. 8, 1876-77, pl. (70) 348, fig. 2.—ELERA, Cat. Fauna Filip., 1895, p. 471 (Cebu).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 17 (Cavite).

Pseudoamia polystigma SEALE, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 274 (Sandakan, Borneo).

Apogonichthys isostigma JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 251, fig. 45. Apia, Samoa.

Fowleria isostigma KENDALL and RADCLIFFE, Mem. Mus. Comp. Zoöl., vol. 35, 1912, p. 104 (Mangareva, Paumotu; types of *Apogonichthys isostigma*).

Apogonichthys auritus (not VALENCIENNES) FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 163 (Mangareva; type of *Apogonichthys isostigma*).

Depth $3\frac{1}{3}$ to 4; head $2\frac{1}{4}$ to $2\frac{2}{5}$, width $2\frac{3}{4}$ to 3. Snout $4\frac{1}{8}$ to 5 in head from snout tip; eye $3\frac{1}{2}$ to $4\frac{1}{5}$, greater than snout or interorbital, subequal with interorbital with age; maxillary reaches opposite hind eye edge, expansion $1\frac{1}{2}$ to $1\frac{2}{3}$ in eye, length 2 in head; band of villiform upper teeth narrow, row of fine, conic lower teeth with median lateral canine in each mandibular ramus followed by 2 smaller ones, 2 long inner upper canines and narrow band or row of fine teeth on vomer and each palatine; interorbital $4\frac{1}{4}$ to $4\frac{1}{2}$, convex; preopercle ridge entire, little distinct, edge entire except 4 or 5 slight denticles at angle; preorbital entire. Gill rakers 2 + 12, lanceolate, with 2 to 4 more as rudiments above and below, longest much greater than gill filaments or $1\frac{2}{3}$ in eye.

Scales 26 to 28 in lateral line to caudal base and 4 or 5 more on latter; 5 above, 7 below, about 25 to 28 predorsal to snout; 4 rows of scales on cheek to preopercle ridge. Tubes in lateral line simple, small, little marked, though well exposed. Scales with 9 or 10 basal radiating striae; 18 to 22 circuli.

D. VI-I, 8, 1, third spine $2\frac{1}{2}$ to $2\frac{2}{3}$ in total head length, third dorsal ray $1\frac{1}{2}$ to $1\frac{3}{5}$; A. II, 8, 1, or 9, 1, second spine 3 to $3\frac{1}{5}$, first ray $1\frac{2}{3}$ to 2; caudal $1\frac{1}{8}$ to $1\frac{1}{5}$, ends in slight median point; least depth of caudal peduncle $2\frac{3}{4}$ to 3; pectoral $1\frac{4}{5}$ to $1\frac{1}{2}$; ventral 2 to $2\frac{1}{8}$.

Light brown generally, finely spotted or marked with minute dark brown rings, each ring enclosing a minute pale spot and usually a single dark ring to a scale. Side of head with similar dark rings only little larger and more scattered on opercular region. Top of head back and end of muzzle dusted with deep brown. Iris brown. Spinous dorsal dusky. Soft dorsal with white margin, also base pale and rest of fin dusky. Anal like soft dorsal. Rounded blackish-brown blotch at base of caudal large as eye. Other fins all pale or whitish.

East Indies, Philippines, Polynesia.

Six examples. Cebu market. March 28, 1909. Length 38 to 73 mm. (1490) 6471 to 6484. Cebu market. August 13, 1909. Length 43 to 72 mm.

One example. Canmahala Bay, Ragay Gulf. March 11, 1909. Length 35 mm.

APOGONICHTHYS GLAGA (Bleeker)

Apogon glaga BLEEKER, Verh. Batav. Genootsch. (Perc.), vol. 22, 1849, p. 29. Batavia, Cheribon, Tjilatjap, Samarang.—DAY, Fishes of India, pt. 1, 1875, p. 62, pl. 16, fig. 10; Fauna Brit. India, Fishes, vol. 1, 1889, p. 498.

Apogonichthys glaga BLEEKER, Verh. Batav. Genootsch., No. 4, vol. 26, 1857, p. 57 (Nagasaki, Java, Singapore).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 247 (copied).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (33) 311, fig. 1.—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Sarangoon, Singapore).—ELERA, Cat. Fauna Filip., 1895, p. 471 (Luzon, Cavite, Santa Cruz).—JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 893 (copied).

Amia glaga BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 100 (Singapore, Banka, Java).

Mionorus glaga JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 17 (Cavite).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 255 (Manila).

Depth $2\frac{2}{3}$ to $2\frac{3}{4}$; head $2\frac{1}{3}$ to $2\frac{1}{2}$, width $2\frac{2}{5}$ to $2\frac{1}{2}$. Snout 5 to $5\frac{2}{3}$ in head from snout tip; eye $4\frac{1}{5}$ to $4\frac{1}{4}$, greater than snout or interorbital or subequal with latter; maxillary reaches opposite hind pupil edge till beyond hind eye edge, expansion $1\frac{1}{4}$ to $1\frac{1}{2}$ in eye, length $1\frac{7}{8}$ to 2 in head; villiform teeth in bands in jaws and on vomer, palatines toothless; preopercle and preorbital entire. Gill rakers 3+11, lanceolate, longer than gill filaments or $1\frac{4}{5}$ in eye.

Scales 23 or 24 in lateral line to caudal base and 3 or 4 more on latter; 2 above, 6 below, 4 or 5 predorsal; 2 rows cover cheek. Tubes in lateral line rather large, moderately exposed and each with small basal scale. Caudal covered with small scales basally, otherwise fins naked. Scales with 18 to 22 basal radiating striae; 90 to 110 apical denticles with 5 or 6 transverse series of basal elements; circuli fine.

D. VII-I, 9, 1, fifth spine $2\frac{2}{3}$ to $3\frac{2}{5}$ in total head length, fifth branched ray $1\frac{3}{5}$ to $1\frac{2}{3}$; A. II, 8, 1, second spine $3\frac{3}{4}$ to 4, third ray $1\frac{4}{5}$ to $1\frac{7}{8}$; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, convex behind; least depth of caudal peduncle 2 to $2\frac{1}{3}$; pectoral $1\frac{2}{3}$ to $1\frac{3}{4}$; ventral $1\frac{2}{3}$ to $1\frac{3}{4}$.

Back brown, sides and below paler to light, with silvery white reflections. Sides with 7 rather diffuse longitudinal dark bands, wide as interspaces which appear well contrasted and following along junctures of scales. Opercle with diffuse neutral dusky or gray shade. Iris pale yellowish-white. Spinous dorsal with terminal half blackish. Soft dorsal with grayish terminally, each membrane from base with 4 or 5 whitish spots and subbasal dark basal area darker or dusky. Caudal grayish terminally. Anal whitish with several rows of deep brown spots subbasally. Paired fins uniformly pale.

India, East Indies, Philippines.

2645 (D. 5361). Corregidor Light, S. 89° W., 7.2 miles (14° 24' 15" N., 120° 41' 30" E.), Manila Bay, Luzon. In 12 fathoms. February 8, 1909. Length 84 to 121 mm. (1137). 3 examples. General color dusky brown, darker on head, lighter below, with metallic tints. Upper part of spinous dorsal blackish. Row of dusky brown spots near bases of second dorsal membranes and other less distinct spots of same color scattered over membranes further out. Blotches composed of very fine blackish spots in the membranes of the anal and outer part of anal membranes and rays yellowish. Caudal membranes dusky. Pectoral rosy hyaline. Ventral margins white.

Five examples. Manila market. December 4, 1908. Length 104 to 126 mm. 4523. Manila market. December 12, 1907. Length 113 mm. Body silvery, with lines of zigzag stripes. First dorsal white, with black spot. Second dorsal with several irregular lines of spots. Caudal dusky posteriorly. Anal plain pale yellow. Pectoral dirty white. Ventral yellowish.

1726. (D. 5208.) Taratara Island, S. 53° W., 1.8 miles (11° 45' 25" N., 124° 18' 05" E.), off western Samar. In 20 fathoms. April 14, 1908. Length 115 mm.

Genus MIONORUS Krefft

Mionorus KREFFT, Proc. Zool. Soc. London, 1867, p. 942. Type *Mionorus lunatus* KREFFT, monotypic.

Eye less than snout, equals interorbital. Mouth cleft oblique. Teeth all villiform, without canines, on vomer and palatines, tongue smooth. Preopercle ridge and edge entire. Opercle with spine. Branchiostegals 7. Scales moderate, 30 in lateral line. Two dorsals, first with 6 spines, second with spine and 9 rays. Anal with 2 spines and 8 or 9 rays. Caudal truncate.

MIONORUS MYDRUS Jordan and Seale

Mionorus mydrus JORDAN and SEALE, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 778, fig. 4. Negros; Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 17 (Manila).

Mionurus bombonesis HERRE, Philippine Journ. Sci., vol. 26, 1925, p. 341, pl. 1. Lake Taal, Laguna de Bombom, Batangas Province, Luzon.

Depth $2\frac{1}{2}$; head $2\frac{1}{4}$, width $2\frac{1}{2}$. Snout $5\frac{2}{3}$ in head from snout tip; eye $2\frac{2}{3}$ in head, greater than snout, subequal with interorbital; maxillary reaches opposite eye center, expansion 3 in eye, length $2\frac{1}{5}$ in head from snout tip; teeth minute, uniform, in narrow bands in

jaws, on vomer and palatines; interorbital $2\frac{1}{3}$, little convex; preopercle edge and ridge entire. Gill rakers $4? + 12$, lanceolate, longer than gill filaments or about $\frac{2}{3}$ of eye.

Scales 24 in lateral line to caudal base and 2 more on latter; 2 scales above, 6 below, 5 predorsal; apparently a single row of scales on cheek. Fins apparently scaleless, except caudal base. Lateral line complete, tubes large, well exposed. Scales with 7 or 8 basal radiating striae; 18 short apical denticles as alternate series; circuli moderate.

D. VI-I, 9, second dorsal spine $2\frac{1}{8}$ in total head length, spine of second dorsal $2\frac{1}{8}$; A. II, 8, spine $2\frac{1}{5}$; caudal (damaged, "doubtless rounded in life"); least depth of caudal peduncle $2\frac{2}{3}$; pectoral $1\frac{1}{2}$; ventral $1\frac{3}{8}$.

Largely dark or dusky. Obscure dark spots, ill defined, on muzzle and opercle. Spinous dorsal dusky terminally. Soft dorsal and anal dusky, posteriorly pale. Pectoral whitish. Ventral blackish.

Only known from the type and one small example. Probably *Mionurus bombonensis* Herre the adult.

51946, U.S.N.M. Negros Island. Dr. Bashford Dean. Length 18 mm.

Genus NEAMIA Smith and Radcliffe

Neamia SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 441. Type *Neamia octospina* SMITH and RADCLIFFE, orthotypic.

Body deep, compressed. Head large. Maxillary long, reaches beyond eye. Bands of small villiform teeth in jaws, few on vomer, none on palatines and no distinct canines. Preopercle ridge and edge entire. Lower gill rakers 11. Scales ctenoid, 21 in lateral line to caudal base. Lateral line complete. Dorsal spines united basally at intersection, spines 8 and rayed fin with spine and 9 rays. Anal with 2 spines and 8 rays. Caudal rounded. Pectoral long.

NEAMIA OCTOSPINA Smith and Radcliffe

Neamia octospina SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 441, pl. 36, fig. 2. Rasa Island, Palawan.

Depth $2\frac{1}{5}$; head $2\frac{2}{5}$, width $2\frac{1}{2}$. Snout $5\frac{1}{2}$ in head from snout tip; eye 4, much greater than snout or interorbital; maxillary reaches slightly beyond eye, expansion $1\frac{1}{2}$ in eye, length 2 in head; teeth very minute, villiform, in bands in jaws and on vomer, obsolete or absent from palatines; interorbital $5\frac{1}{4}$, but very slightly convex; preopercle with entire ridge and edge. Gill rakers $3 + 11$, lanceolate, little longer than gill filaments or $2\frac{1}{2}$ in eye.

Scales 21 in lateral line to caudal base and 2 more on latter; 2 above, 8 below, 6 predorsal, at least row of large scales on cheek; head except cheeks and opercles naked. Tubes in lateral line rather large, each with well developed basal scale. Scales with 11 basal radiating striae; 46 apical denticles, with 4 transverse series of basal elements; circuli rather fine.

D. VIII, I, 9, third spine $2\frac{2}{5}$ in total head length, fourth ray 2; A. II, 8, second spine $3\frac{3}{5}$, third ray $2\frac{2}{5}$; caudal $1\frac{1}{3}$, ends in median point; least depth of caudal peduncle $2\frac{1}{2}$; pectoral $1\frac{1}{3}$; ventral $1\frac{3}{5}$.

Largely pale uniform brown. Iris whitish. Dark band made up of brown dots slopes obliquely down over cheek close behind maxillary and another as a postocular line.

Only known from the type.

No. 70251, U.S.N.M. Rasa Island, Mantaquin Island, Palawan. April 1, 1909. Length 37 mm.

Genus AMIA Gronow

Amia GRONOW, Zoophylac., 1763, p. 80. Species nonbinomial. Type *Amia moluccensis* VALENCIENNES, designated by GILL, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 237.

Apogon LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1802, p. 411. Type *Apogon ruber* LACÉPÈDE, monotypic.

Ostorhinchus LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, p. 23. Type *Ostorhinchus fleurieu* LACÉPÈDE, monotypic.

Dipterodon LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, p. 167. Type *Dipterodon hexacanthus* LACÉPÈDE, designated by JORDAN and EVERMANN, Genera of Fishes, vol. 1, 1917, p. 63.

Macrolepis RAFINESQUE, Analyse de la nature, 1815, p. 89. Type *Apogon ruber* LACÉPÈDE. *Macrolepis* RAFINESQUE proposed to replace *Apogon* LACÉPÈDE.

Monoprion POEY, Mem. Hist. Nat. Cuba, vol. 2, 1860, p. 123. Type *Monoprion maculatus* POEY, monotypic.

Lepidamia GILL, Proc. Acad. Nat. Sci. Philadelphia, 1863, p. 81. Type *Amia kalosoma* BLEEKER, monotypic.

Pristiapogon KLUNZINGER, Verh. zool. bot. Ges. Wien, 1870, p. 715. Type *Apogon fraenatus* VALENCIENNES, monotypic.

Vincentia CASTELNAU, Proc. Zool. Acclim. Soc., Victoria, vol. 1, 1872, p. 245. Type *Vincentia waterhousei* CASTELNAU, monotypic.

Monosira POEY, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 10, 1881, p. 326. Type *Monosira stahli* POEY, monotypic.

Rhabdamia WEBER, Notes Leyden Mus., vol. 31, 1909, p. 165. Type *Rhabdamia clupeiformis* WEBER, designated by JORDAN, Genera of Fishes, pt. 4, 1920, p. 534, as orthotypic.

Nectamia JORDAN, Copeia, No. 44, May 24, 1917, p. 46. Type *Apogon fuscus* QUoy and GAIMARD, orthotypic.

Zoramia JORDAN, Copeia, No. 44, May 24, 1917, p. 46. Type *Apogon graeffii* GÜNTHER, orthotypic.

Brephamia (JORDAN) JORDAN and JORDAN, Mem. Carnegie Mus., vol. 10, No. 1, 1922, p. 43. Type *Apogon parvula* SMITH and RADCLIFFE, orthotypic.

Body oblong, compressed. Head large. Eye large, usually greater than snout. Mouth wide, oblique. Maxillary reaches below middle of eye. Villiform teeth only, in bands in jaws, on vomer and palatines. Preopercle ridge double, edge somewhat serrate, at least in young, sometimes entire with age. Opercle with spine posteriorly. Gill rakers rather long. Vertebrae 25, of which 14 caudal. Scales large, ctenoid or cycloid. Top of head, interorbital and snout naked. Lateral line usually complete, scales 20 to 40. Dorsal spines 6 or 7

strong. Second dorsal short, remote, rays 8 to 10. Anal spines 2, rays 8 or 9, similar and opposite to soft dorsal. Pectoral and ventral moderate.

We retain in this large group those species in which the caudal is at least emarginate to forked. But few natural groups seem to eventuate which may be indicated as valid subgenera.

As several species have been doubtfully reported from the Philippines, we give them with references as follows:

AMIA CYANOTAENIA (Bleeker)

Apogon cyanotaenia BLEEKER, Nat. Tijds. Nederland. Indië, vol. 5, 1853, p. 71. Lawajong, Solor.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 242 (copied).—GORGZA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 283 (Cebu).—WEBER, Semon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 263 (Amboina).—ELERA, Cat. Fauna Filip., 1895, p. 471 (Cebu).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 223 (Saleyer).

Amia cyanotaenia BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 85, pl. (42) 320, fig. 2 (Solor, Amboina, Aru).

In the Philippines known from the records of Gorgza and Elera.

AMIA NIGRIPINNIS (Cuvier)

Apogon nigrispinnis CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 152. Java and Pondicherry.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 235 (China and East Indies).—PLAYFAIR, Fishes of Zanzibar, 1886, p. 20 (Zanzibar).—GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 21 (Bonin Islands).—DAY, Fishes of India, pt. 1, 1875, p. 60, pl. 16, fig. 6 (type; Madras).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Matang, Borneo).—DAY, Fauna Brit. India, Fishes, vol. 1, 1889, p. 498.—ELERA, Cat. Fauna Filip., 1895, p. 469 (Luzon, Cavite, Santa Cruz).—REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, 1905, p. 330 (Persian Gulf).

Amia nigrispinnis BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 99 (copied).

? *Apogon punctatus* REGAN, Trans. Linn. Soc. London, ser. 2, Zool., vol. 12, 1907, p. 225, pl. 24, fig. 1. Cargados, Carajos, Indian Ocean, in 20 to 30 fathoms.

Known from Elera's Philippine record.

AMIA POECILOPTERA (Cuvier)

Apogon poecilopterus (KÜHL and VAN HASSELT) CUVIER, Hist. Nat. Poiss., vol. 2, 1826, p. 154. Java.—CANTOR, Cat. Malay. Fishes, 1850, p. 2 (Pinang Sea, Singapore).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 232 (copied).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (Cebu).

Apogon poecilopterus ELERA, Cat. Fauna Filip., 1895, p. 469 (Cebu).

Amia poecilopterus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 95 (compiled).

A doubtful species not described since Cantor's time. Meyer and Elera have given records for the Philippines though without details of their materials. The species is described with a large dark blotch on the spinous dorsal which is said to have 6 spines and the soft dorsal marked with ocellated black spots.

*a*¹. Scales large, 20 to 30 in lateral line.

*b*¹. SPHAERAMIA, new subgenus. Body orbicular, depth more than half length; body spotted with brown.

*c*¹. Front dorsal rays prolonged in filaments; broad transverse dark band from first dorsal, with brown spots posteriorly. nematoptera
*c*². Front dorsal rays not prolonged in filaments; narrow dark transverse band from front of first dorsal to vent and brown spots
 all over the body. orbicularis

*b*². AMIA. Body elongate, depth less than half length.

*d*¹. Two broad dark transverse bands, first from first dorsal, second from soft dorsal.

*e*¹. Dorsal spines 7; caudal base with small round dark spot. taeniata

*e*². Dorsal spines 6.

*f*¹. Caudal with round dark spot. rhodoptera

*f*². No dark caudal spot, upper and lower caudal edges dusky. kolimatodon

*d*². No dark transverse bands; back of tail with large dark blotch; dark streak obliquely across cheek from eye; dorsal
 spines 7. bandanensis

*d*³. Body with one or more longitudinal dark bands from head to caudal.

*g*¹. Dorsal spines 7.

*h*¹. Caudal with dark transverse bands, though also black median basal spot present; 2 pale longitudinal bands (leaving
 pale interspaces in life as blue longitudinal bands parallel with dorsal streak and blue streak from eye to
 maxillary). hartzfeldii

*h*². Caudal without transverse dark bands.

*i*¹. Six golden longitudinal bands on blue ground color; no dark caudal spot. cyanosoma

*i*². Body with dusky or blackish longitudinal bands.

*j*¹. Body with 18 to 20 blackish longitudinal bands (7 to 10 in young). multilaeniata

*j*². Body with 5 or 6 blackish longitudinal bands.

*k*¹. Body with 6 blackish longitudinal bands. endekataenia

*k*². Body with 5 blackish longitudinal bands.

*l*¹. Caudal base with distinct round black spot. angustata

*l*². Caudal base without round black spot.

*m*¹. Eye small, equals snout, $3\frac{1}{2}$ in head; body deep; second black longitudinal band merges with third on
 straight part of lateral line, fourth and fifth indistinct, former crossing side above pectoral base.

fasciata

*m*². Eye larger, less than $3\frac{1}{2}$ in head and longer than snout; body relatively slender.

- n*¹. Dark bands wider than light interspaces, 3 upper very dark, 2 converging to meet median stripe at caudal base.....*arوبيensis*
- n*². Dark bands narrower than light interspaces, not connivent at caudal base.....*novemfasciata*
- k*³. Body with 4 dark brown or blackish lateral longitudinal bands, median separated from round black median spot on caudal peduncle at caudal base.....*doederleini*
- k*⁴. Body with 3 dark brown or dusky lateral longitudinal bands and small black basal caudal spot just above middle of lateral line at caudal base.....*fusca*
- k*⁵. Body with 2 brown or dusky longitudinal bands on deep rose green ground color, lower reaches caudal medianly, but without dark basal caudal spot.
- o*¹. Dark median line from snout to dorsals and along bases of both fins.....*quadrifasciata*
- o*². No median dark line from snout to dorsals and along bases of both fins.....*kiensis*
- k*⁶. Single dark or blackish median band from snout to eye; tail with round dark or black spot.
- p*¹. First dorsal with transverse yellow bands; second dorsal rose, spotted brown and pearly.....*kalloptera*
- p*². First dorsal without transverse yellow bands; second dorsal without spots.
- q*¹. Dark caudal spot above end of dark lateral band.....*exostigma*
- q*². Dark caudal spot median or at end of dark lateral band.....*fraenata*
- r*¹. Five longitudinal dark bands.
- r*¹. Median dark lateral band reaches caudal base where broken as 2 small dark spots.....*compressa*
- r*². No dark caudal spot.....*margaritophora*
- r*². Three dark brown longitudinal bands; spinous dorsal front dusky; dark subbasal band on soft dorsal; round black caudal spot.....*parvula*
- r*³. Two dark brown longitudinal bands, upper parallel with lateral line, lower horizontal from eye to caudal; round black basal caudal spot.....*amboinensis*
- r*⁴. Single dark median longitudinal band from suprascapular to caudal; large round black suprascapular spot above dark lateral band.....*laterale*
- d*⁴. No dark transverse or longitudinal bands on body.
- t*¹. Dorsal spines 7.
- u*¹. Body largely uniform brown; no dark rostral bar to eye.
- v*¹. Hind part of tail with large transverse blackish band; 2 blue bands from snout to eye and opercles.....*fleurieu*
- v*². No black band on tail or blue bands on head.

- w*¹. Body uniformly dark brown; second dorsal and anal each with large basal black or blue ocellus.-----melas
- w*². Body uniformly rosy, yellowish or pale brown.
- x*¹. No dark rostral bar; spinous dorsal little darker terminally.
- y*¹. Second dorsal spine not elongated and filamentous, but little over half of head-----monochroa
- y*². Second dorsal spine elongated, filamentous, usually greater than head. hypselonota
- x*². Dark rostral bar present.
- z*¹. No dark median caudal spot.
- aa*¹. Teeth evenly villiform in jaws; lower gill rakers 20-----atrogaster
- aa*². Inner row of teeth in each jaw little enlarged, also lower lateral teeth; lower gill rakers 12-----apogonoides
- z*². Small black round caudal spot.
- bb*¹. No black spot each side of occiput.
- cc*¹. Black rostral bar includes chin, faint on postocular, not reaching body.
- dd*¹. Narrow black line along second dorsal base to tips of last rays; upper membranes of spinous dorsal dusky; round black basal caudal spot simple-----diversa
- dd*². Soft dorsal and anal often with dark subbasal band; spinous dorsal with wide black oblique band anteriorly; small black median caudal spot, sometimes reflected above and below.
- cc*². Black rostral band not including chin, reaches postocular and caudal peduncle, another parallel black band from snout above till below soft dorsal; spinous dorsal apex black-----semilineata
- bb*². Small black spot each side of occiput; black rostral bar includes chin, not on postocular; spinous dorsal blackish terminally-----notata
- w*³. Brown, each scale with broad deep brown bar producing reticulated design; small round dusky caudal spot basally-----griffini

*w*⁴. Pale brown, each scale on side with dark median blotch; 2 dark oblique bands on cheek from eye ----- *novae-guineae*

*l*². Dorsal spines 6.

*ee*¹. Depth $2\frac{1}{4}$ to $2\frac{7}{8}$.

*ff*¹. Pale brown, without any markings; depth $2\frac{3}{4}$ to $2\frac{7}{8}$.

*ff*². Tail without large lateral dusky blotch but dark band on lateral line dark at caudal base and out over caudal medially; broad dark postocular band to pectoral base; depth $2\frac{3}{8}$.
----- *cardinalis*

*ff*³. Tail with large lateral dusky blotch.

*gg*¹. Broad brown band from snout to opercle; depth $2\frac{2}{3}$ to $2\frac{3}{8}$.
----- *sangiensis*

*gg*². No dark band from snout to opercle; depth $2\frac{1}{2}$ to $2\frac{1}{2}$.
----- *hyalosoma*

*ee*². Depth $3\frac{2}{5}$ to $3\frac{3}{8}$.
----- *cypselura*

*a*². LEPIDAMIA. Scales small, 36 in lateral line; 5 dark longitudinal lines above and parallel with lateral line and 11 dark horizontal lines below ----- *multitaeniata*

SPHAERAMIA, new subgenus⁴

Type.—*Apogon nematoptera* BLEEKER.

Diagnosis. Distinguished from subgenus *Amia* by the rounded or orbicular body, depth more than half the length. Scales large, as in *Amia*. Body with brown spots.

AMIA NEMATOPTERA (Bleeker)

Apogon nematoptera BLEEKER, Act. Soc. Sci. Ind. Néerland. (Manado), vol. 1, 1856, p. 35. Manado, Celebes.

Apogon nematopterus GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 233 (copied).

Amia nematopterus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1875-76, p. 79 (Celebes).

Amia nematophora BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1875-76, pl. (35) 313, fig. 1.

Amia nematoptera FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 154 (New Guinea).

Depth $1\frac{4}{5}$ to $1\frac{7}{8}$; head $2\frac{1}{5}$ to $2\frac{2}{5}$, width 2 to $2\frac{1}{10}$. Snout 4 to $4\frac{1}{2}$ in head from snout tip; eye $2\frac{1}{3}$ to $2\frac{2}{3}$, much greater than snout or interorbital; maxillary reaches $\frac{3}{5}$ to $\frac{1}{2}$ in eye, expansion $2\frac{1}{4}$ to $2\frac{1}{2}$ in eye, length 2 to $2\frac{1}{5}$ in head; bands of very minute villiform teeth in jaws, on vomer and palatines; interorbital 3 to $3\frac{2}{3}$, nearly level; preopercle ridge entire, edge finely denticulate; preorbital entire. Gill rakers 7 + 24, lanceolate, twice gill filaments or 2 in eye.

Scales 22 or 23 in lateral line to caudal base and 3 or 4 more on latter; 2 above, 6 below, 6 or 7 predorsal, 2 rows on cheek. Tubes in lateral line large, simple, well exposed, without basal scale. Scales with 10 to 11 basal radiating striae; 77 to 113 apical denticles with 2 to 4 transverse series of basal elements; circuli fine.

D. VI-I, 9, 1, second spine little enlarged though third longest or $1\frac{1}{8}$ to $1\frac{1}{4}$ in total head length, front dorsal rays elongated and end in filaments apparently in males or first $1\frac{1}{4}$ to 2 in combined head and body to caudal base; A. II, 9, 1, second spine $1\frac{1}{2}$ to $1\frac{2}{3}$ in total head length, first branched ray $1\frac{1}{5}$ to $1\frac{1}{4}$; caudal rather deeply emarginate, lobes pointed, 2 to $2\frac{1}{2}$ in combined head and body to caudal base; least depth of caudal peduncle 2 to $2\frac{2}{5}$ in total head length; pectoral $1\frac{1}{4}$ to $1\frac{1}{3}$; ventral $2\frac{1}{5}$ to $2\frac{1}{4}$ in combined head and body to caudal base.

Brown generally, general color more or less uniform. Side of head and breast with silvery reflections. Rather broad deep brown margin to hind opercle edge. Broad blackish brown band from spinous dorsal base down to postventral region, border of each scale broadly darker and contrasted with pale brown center to form more or less reticulate pattern. Tail marked with many round brown spots

⁴σφαῖρα sphere, with reference to the spherical profile; *Amia*.

about size of pupil, those antero-medianly and at caudal base more or less fused. Spinous dorsal and ventrals blackish, other fins more or less brownish, caudal edged above and below with little deeper also basally little darker. Iris pale yellowish to neutral gray or dusky brown.

East Indies, Philippines.

14660, 14661, 23246. Bolalo Bay, Palawan Island. December 21, 1908. Length 60 to 67 mm.

16278, 16280, 23340 to 23343, 23375. Biri Channel. June 1, 1909. Length 47 to 77 mm. 18 examples.

23764. Biri Channel. June 2, 1909. Length 50 to 78 mm.

8489 to 8493. Catbalogan, Samar Island. April 16, 1908. Length 72 to 84 mm. Eleven examples. Endeavor Strait, northwest coast of Palawan. December 22, 1908. Length 40 to 68 mm.

16314. Endeavor Strait. December 23, 1908. Length 74 mm.

14106 and 14107. Endeavor Strait. December 24, 1908. Length 72 to 74 mm.

17335, 23951 to 23955. Isabel, Basilan Island. September 11, 1909. Length 68 to 72 mm.

Five examples. Oyster Inlet, Ulugan Bay, Palawan Island. December 28, 1908. Length 44 to 72 mm.

24091. Port Uson, west of Pinas Island. December 17, 1908. Length 52 to 65 mm. (815) 2 examples. Anterior part of body, also head, with yellowish olive shades. Spots on posterior side bronze on pale ground color. Black bar includes first dorsal and ventral. Fins rather olivaceous. Second dorsal, anal and caudal dusky.

23862 to 23864. Rapu Rapu Island. June 22, 1909. Length 64 to 72 mm.

One example. Rasa Island, Mantaquin Bay, Palawan. Length 36 mm.

19824 and 19825. Romblon. March 26, 1908. Length 39 to 70 mm. 31 examples.

Ten examples. Romblon Harbor. March 25, 1908. Length 47 to 58 mm.

22897. Romblon Reef. March 25, 1909. Length 64 mm.

23565 to 23568. Romblon Reef. March 26, 1908. Length 42 to 59 mm.

14059 to 15777. Sacol Island, east of Zamboanga. September 9, 1909. Length 53 to 63 mm.

19554 and 23404. Singaan Island, between Jolo and Tawi Tawi. September 21, 1909. Length 74 to 78 mm.

24002. Sitanki Reef. September 24, 1909. Length 62 mm.

Eleven examples. South lagoon, Tumindao Island, Sulu Archipelago. February 26, 1908. Length 59 to 76 mm.

24090. Tataan, Simaluc Island. February 19, 1908. Length 42 to 64 mm. Eight examples (145). Head and front part bronze green with pearl reflection. Posterior parts pearl black. Black band, including spinous dorsal, vertically below abdominal region; across body only margins of scales black, centers pearly; behind black band numerous roundish spots of dark smoke gray, size of pupil or less. Black bar across opercle edge; premaxillary and lower lip slate blue; dash of red on cheek. Iris with reddish golden and brown shades. Spinous dorsal with brownish shades, tips of first and second membranes with some red. Soft verticals and caudal smoky, with reddish shades. Pectoral hyaline pink. Ventral golden olive, tips of first 2 or 3 rays mottled with blood red.

Fifteen examples. Tataan. February 20, 1908. Length 25 to 64 mm.

Five examples. Tataan. February 21, 1908. Length 42 to 62 mm.

- 15586, 15587, 23509 to 23511. Tulayan Island, vicinity of Jolo. September 15, 1909. Length 63 to 75 mm.
- 23175 to 23177, 23278, 24016. Tutu Bay, first anchorage, Jolo Island. September 19, 1909. Length 69 to 78 mm.
- 23762 and 23763. Daisy Island, west of Bumbum, Borneo. January 6, 1910. Length 55 to 57 mm.
- 23898 and 23899. Pendek Island, Buton Strait. December 15, 1909. Length 60 to 71 mm.
24030. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 70 mm.
- 14396, 14936, 22728, 23907 to 23912, 23941 to 23942. Talisse Island. November 9, 1909. Length 63 to 82 mm. 25 examples.
- 23854 to 23856, 23920. Togian Bay, Togian Island, Gulf of Tomini, Celebes. November 19, 1909. Length 54 to 66 mm.
- 23606 to 23677. Gane Road, Gillolo Island. December 1, 1909. Length 59 to 66 mm.
- 23309, 23310, 23697. Gomomo Island, Pitt Passage. December 3, 1909. Length 68 to 75 mm.

AMIA ORBICULARIS (Cuvier)

Apogon orbicularis (KÜHL and VAN HASSELT) CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 155. Java.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 233 (copied).—DAY, Proc. Zool. Soc. London, 1870, p. 681 (Andamans).—GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 22, pl. 20, fig. D (Radaek Island).—DAY, Fishes of India, pt. 1, 1875, p. 65, pl. 17, fig. 7 (Andamans).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (Manado, Celebes; Sangi; Manila Bay, Luzon; Cebu; Rubi, New Guinea).—DAY, Fauna Brit. India, vol. 1, 1889, p. 500.—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 221 (Biaru).—BEAUFORT, Bijl. Dierk., Amsterdam, 1913, p. 115 (Najalibit Bay, Waigiu; Amboina?).

Amia orbicularis BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873–76, p. 79 (Sumatra, Nias, Singapore, Java, Sangir, Ceram, Amboina, Goram); vol. 8, 1876–77, pl. (61) 339, fig. 1.—SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 242 (Zamboanga).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 154 (Ponapé, Pelew Islands, Kingsmill, Truk, Moen).

Apogon nigromaculatus HOMBRON and JACQUINOT, Voy. Astrolabe, Zool., vol. 3, 1853, p. 32, pl. 1, fig. 2. New Guinea.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 233 (copied).

Amia nigromaculata BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873–76, p. 80 (compiled).

Depth $1\frac{3}{4}$ to $1\frac{4}{5}$; head $2\frac{1}{4}$ to $2\frac{1}{3}$, width $1\frac{7}{8}$ to 2. Snout $3\frac{3}{4}$ to 4 in head from snout tip; eye $2\frac{3}{4}$ to 3, greater than snout or interorbital; maxillary reaches opposite eye center, expansion 2 in eye, length 2 to $2\frac{1}{10}$ in head; bands of villiform teeth in jaws, on vomer and palatines; interorbital $2\frac{1}{2}$ to $3\frac{3}{4}$, nearly level or only slightly convex; preopercle ridge entire, edge denticulate; preorbital entire. Gill rakers 5 + 20, lanceolate, little longer than gill filaments or $2\frac{1}{4}$ in eye.

Scales 23 in lateral line to caudal base and 3 more on latter; 2 above, 6 below, 6 predorsal, 2 rows on cheek. Tubes in lateral line simple, well exposed, large, without basal scale. Scales with 12 or 13

basal radiating striae; 98 to 147 apical denticles, with 2 to 4 transverse series of basal elements; circuli fine.

D. VI-I, 9, 1, second spine $1\frac{1}{5}$ to $1\frac{1}{3}$ in total head length, first branched ray $1\frac{1}{4}$ to $1\frac{1}{3}$; A. II, 8, 1, second spine $1\frac{3}{5}$ to $1\frac{2}{3}$, first branched ray $1\frac{1}{2}$ to $1\frac{3}{5}$; caudal 1 to $1\frac{1}{10}$, slightly emarginate behind; least depth of caudal peduncle $1\frac{7}{8}$ to 2; pectoral $1\frac{1}{3}$ to $1\frac{2}{5}$; ventral $1\frac{1}{4}$ to $1\frac{1}{3}$.

Light brown generally, with some bright or silvered reflections on opercle and chest. Head above and on sides speckled with dusky to blackish brown, often with large dark blotch below hind eye edge and another little more posterior. Iris pale yellowish to brownish or neutral gray. Predorsal and back with variable small scattered dark or dusky specks to spots. Oblique blackish brown band from front of spinous dorsal till midway in postventral space, but not extended below across belly, may be broken in places also of variable width. Side of tail with axial row of usually four or five blackish spots, sometimes more or less connected, usually distinct. At caudal base arc of four black spots. Also other scattered blackish blotches on tail. Fins all very pale brownish, dusky brownish basal band or line on soft dorsal and anal. Ventral with broad terminal blackish border, fin otherwise with brownish and whitish narrow edge to front of first branched ray beyond tip of spine. In most cases spinous dorsal little darker than other fins, especially anteriorly.

Andamans, East Indies, Philippines. Of our series from Canmahala Bay, 7 are males with the mouth cavity and pharynx crammed full of ova.

23313. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 46 to 95 mm. 66 examples.

8571. Cebu market. April 5, 1908. Length 68 mm.

Two examples. Cebu market. August 28, 1909. Length 55 to 58 mm.

Three examples. Mactan Reef. August 31, 1909. Length 36 to 50 mm.

One example. Mahinog, Camiguin Island, between Leyte and Mindanao. August 3, 1909. Length 36 mm.

Two examples. Reef opposite Cebu. April 5, 1908. Length 16 to 23 mm.

Nineteen examples. Reef opposite Cebu. April 7, 1908. Length 18 to 75 mm.

Seventeen examples. San Pascual, Burias Island. March 8, 1909. Length 48 to 80 mm.

Two examples. Simaluc Island, north of Tawi Tawi. September 22, 1909. Length 46 mm.

23620. Tataan, Simaluc Island, Tawi Tawi Group, Sulu Archipelago. February 20, 1908. Length 53 to 71 mm. Seven examples (238). Body grayish above, silvery white on sides and below. Purplish sheen on opercle and cheek. Oblique black bar, wide as pupil from anterior end of first dorsal to behind ventrals; row of five or six black spots from this line to caudal base; several other spots on back and below lateral line. First dorsal pale green; first membrane black with oblique band from trunk extending on it; several small black spots at base. Second dorsal hyaline, dusky at base. Caudal dusky. Anal hyaline dusky at base and on first membrane, fin very deep. Pectoral hyaline.

Ventral spine bluish, membranes of fin green with white tip, other rays white with black marginal zone. This fish was found in a small compact school on sandy shores, on edge of mangroves. The black oblique bar was very conspicuous in life. The fish were not shy, but very active and hard to catch.

23311 and 23696. Gomomo Island, Pitt Passage. December 3, 1909. Length 70 to 74 mm.

24048. Powati Harbor, Makyan Island, Molucca Passage. November 28, 1909. Length 67 mm.

Subgenus *AMIA* Gronow

Body elongate, depth less than half of length. Scales large, 20 to 30 in lateral line.

AMIA TAENIATA (Cuvier)

Apogon taeniatus (EHRENBERG) CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 159. Djedda, Red Sea.—RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 48 (Red Sea); Neue Wirbelth., Fische, 1835, p. 87 (copied).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 234 (copied).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 712 (copied).—DAY, Fishes of India, pt. 1, 1875, p. 101 (type); Fauna Brit. India, vol. 1, 1889, p. 493.—BOULENGER, Proc. Zool. Soc. London, 1889, p. 238 (Muscat).—ELERA, Cat. Fauna Filip., 1895, p. 469 (Luzon, Manila).

Amia taeniata BLEEKER, Naturk. Verh. Holland. Maatsch. Wet. (Rev. Apogon), vol. 3, ser. 3, pt. 1, 1874, p. 24 (synonymy).

Apogon bifasciatus RÜPPELL, Neue Wirbelth., Fische, 1839, p. 86, pl. 22, fig. 2. Djedda, Red Sea.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 238 (China, Red Sea, Philippines).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 42 (Hong Kong).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 711 (Koseir, Red Sea).—DAY, Fishes of India, pt. 1, 1875, p. 62, pl. 16, fig. 9 (Madras); Suppl., 1888, p. 784 (note).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Singapore, Canton).—DAY, Fauna Brit. India, vol. 1, 1889, p. 497 (Madras).—ELERA, Cat. Fauna Filip., 1895, p. 470 (Luzon, Manila, Cavite, Santa Cruz).—BORSIERI, Ann. Mus. Civ. Stor. Nat. Genova, vol. 41, 1904, p. 190 (Noira on Daalac Island and Suakim).—REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, 1905, p. 330 (Persian Gulf).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, Math.-Nat. Kl., vol. 71, pt. 1, 1907, p. 129 (Gischin, Sokotra).—ZUGMAYER, Abh. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 10 (Oman).—REGAN, Ann. Durban Mus., vol. 2, 1919, p. 197 (Durban, Natal).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 521 (Natal coast).

Apogon (Amia) bifasciatus KLUNZINGER, Fische Roth. Meer., 1884, p. 21.

Amia bifasciata BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 81 (note).—SEALE, Philippine Journ. Sci., vol. 9, 1914, p. 63 (Hong Kong).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 24 (Cebu).

Apogon trimaculatus (not CUVIER) RICHARDSON, Ichth. China, Japan, 1846, p. 221 (China).

Apogon maximus BOULENGER, Proc. Zool. Soc. London, 1887, p. 655. Muscat, East Arabia; Proc. Zool. Soc. London, 1889, p. 244 (Muscat).—ZUGMAYER, Abh. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 10 (Oman).

Depth $2\frac{2}{5}$ to $2\frac{1}{2}$; head $2\frac{1}{5}$ to $2\frac{1}{2}$, width 2 to $2\frac{1}{8}$. Snout 4 in head from snout tip; eye 3 to $3\frac{1}{3}$, greater than snout or interorbital; maxillary $\frac{1}{2}$ to $\frac{3}{5}$ in eye, expansion 2 in eye, length 2 to $2\frac{2}{5}$ in head;

bands of fine villiform teeth in jaws, on vomer and palatines; inter-orbital $4\frac{2}{3}$ to $4\frac{3}{4}$, level; preopercle ridge entire, edge finely denticulate. Gill rakers 3+7, lanceolate, with 2 more as rudiments above and 4 to 6 below; length little longer than gill filaments or $2\frac{1}{4}$ in eye.

Scales 23 in lateral line to caudal base and 3 to 5 more on latter; 2 above, 7 below, 3 predorsal, 2 rows on cheek; muzzle, including interorbital, maxillary and suborbitals, naked. Lateral line of rather large tubes, well exposed, each with basal crenulated scale. Scales with 14 to 17 basal radiating striae; 128 to 148 apical denticles with 1 to 3 transverse series of basal elements; circuli fine.

D. VII-I, 8, 1, or 9, 1, third spine $1\frac{3}{4}$ to $1\frac{7}{8}$ in total head length, first ray $1\frac{1}{5}$ to $1\frac{1}{4}$; A. II, 8, 1, second spine $2\frac{1}{5}$ to $2\frac{3}{5}$, first ray $1\frac{3}{5}$ to $1\frac{3}{4}$; caudal $1\frac{1}{5}$ to $1\frac{1}{3}$, hind edge slightly emarginate; least depth of caudal peduncle $2\frac{1}{2}$ to $2\frac{4}{5}$; pectoral $1\frac{1}{2}$ to $1\frac{2}{3}$; ventral $1\frac{2}{5}$ to $1\frac{1}{2}$.

Body brown, much paler below. Diffuse dusky blotch at occiput. Diffuse vertical dusky bar down from front of spinous dorsal to median axis of body or lower. Also another, similar, from front of second dorsal but behind spine of fin. Small, round, dusky spot at caudal base medianly, smaller than pupil. Fins variably pale brown to more or less dusky, sometimes quite dark. Dark bands on back often well reflected on bases of dorsals and spinous dorsal always more or less deep dusky terminally. Pectoral pale. Ventral more or less dusky, especially so anteriorly and terminally in most examples.

Red Sea, Natal, India, East Indies, Philippines, China. It was not obtained by Bleeker. The original figure by Rüppell agrees in nearly every respect with our examples, except that the second dorsal spine is about $\frac{2}{5}$ length of third and the first spine about half the length of second in Rüppell's drawing. They are surely like Day's figure of *Apogon bifasciatus*. Day's figure of *Apogon taeniatus* differs in that the third dorsal spine is $\frac{4}{5}$ of the fourth.

(1952). Cabalian Point, Jolo. September 18, 1909. Length 48 mm. (D. 5555). 13679. Manila market. June 24, 1908. Length 117 mm. 23480. Mariveles Wharf, Manila Bay. January 30, 1909. Length 88 mm. 17285. Nabatas Point, Samar Island. July 24, 1909. Length 122 mm. 11660. Kowloon market, China. October 5, 1908. Length 109 mm.

AMIA RHODOPTERA (Bleeker)

Apogon rhodopterus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 62. Singapore.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 233 (copied).

Amia rhodopterus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 81, pl. (34) 312, fig. 1 (Singapore).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 155 (Shortland Island, Samoa).

Amia rhodoptera FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 273 (Philippines).

Amia koilomatodon (not BLEEKER) JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 240, fig. 34 (Apia and Pago Pago).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 71 (Bacon).—FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippine materials).

Depth $2\frac{1}{3}$ to $2\frac{1}{2}$; head $2\frac{1}{2}$ to $2\frac{3}{4}$, width $1\frac{7}{8}$ to 2. Snout $3\frac{4}{5}$ to 4 in head from snout tip; eye $2\frac{4}{5}$ to $3\frac{4}{5}$, greater than snout or interorbital or subequal with snout with age; maxillary reaches opposite $\frac{1}{2}$ to $\frac{3}{4}$ in eye, expansion $1\frac{4}{5}$ to $2\frac{1}{5}$ in eye, length $1\frac{7}{8}$ to 2 in head; bands of villiform teeth in jaws, on vomer and palatines; interorbital $4\frac{1}{2}$ to $4\frac{7}{8}$, nearly level; preopercle ridge and edge both strongly denticulate; preorbital edge with age, also lower orbital ridge, spinescent. Gill rakers 6+15, above and below 3 or 4 as rudiments, others lanceolate, greatly longer than gill filaments or half of eye.

Scales 22 or 23 to caudal base and 4 to 6 more on latter; 2 above, 6 below, 3 or 4 predorsal, 2 or 3 rows on cheek; muzzle, including maxillary, preorbital and interorbital naked. Tubes in lateral line large, simple, each well exposed. Scales with 13 or 14 basal radiating striae; apical denticles 122 to 194 with 1 or 2 transverse series of basal elements; circuli fine and absent apically.

D. VI-I, 9, 1, second spine $1\frac{2}{3}$ to $1\frac{3}{4}$ in total head length, first branched ray $1\frac{1}{4}$ to $1\frac{1}{3}$; A. II, 8, 1, second spine $2\frac{1}{4}$ to $2\frac{1}{3}$, first branched ray $1\frac{2}{5}$ to $1\frac{1}{2}$; caudal $1\frac{1}{10}$ to $1\frac{1}{8}$, emarginated moderately behind with lobes rounded; least depth of caudal peduncle $2\frac{1}{4}$ to $2\frac{1}{3}$; pectoral $1\frac{1}{3}$ to $1\frac{2}{5}$; ventral $1\frac{2}{5}$ to $1\frac{1}{2}$.

Back and upper surfaces brown, lower and under surfaces paler. From lower eye edge deep brown bar obliquely across cheek to preopercle angle. Iris pale yellowish to brown, neutral or slate. Dusky brown transverse band from bases of longest dorsal spines down to level of pectoral, about scale or more in width and usually broken or incomplete opposite body axis laterally. Second narrower dusky brown transverse band from bases of last dorsal rays, extends downward well toward anal, also similarly broken at body axis. Small rounded dusky brown spot, less than half of pupil, at base of caudal medianly. Fins all dull brownish, variously marbled or clouded with darker, especially basally. Paired fins usually much paler than others. Often small inconspicuous dusky spot at bases of last anal rays. In small examples upper and lower caudal edges show more distinctly darker in most cases.

Only known previously from three examples Bleeker described from Singapore. It is greatly like *Apogon taeniatus* as figured and described by Day, but different. All our examples show the vertical dark bands different. They are always broken, besides the second extends from the bases of the last dorsal rays and not the median as Day shows. They also differ in the ridge as well as the edge of the preopercle denticulate. Day shows the ridge of the preopercle entire.

None of our examples has the first membrane of the ventral dark. Also all have the dark caudal spot much smaller, in no case greater than a scale in extent. Bleeker's figure of the present species is also somewhat different in minor details. He does not show the dark vertical bars broken or in any way incomplete. There is also no indication of the usual dark spot at the bases of the last anal rays. Many of our examples have a dark subbasal streak on second dorsal, also not shown by Bleeker.

21862. Biri channel, east coast Luzon. June 1, 1909. Length 116 mm.
14912 and 23812. Biri Channel. June 2, 1909. Length 106 to 114 mm.
23242 and 23245. Bolalo Bay, Palawan. December 21, 1908. Length 130 to 134 mm.
7482, 8058, 8372, 23573. Busin Harbor, Burias Island. April 22, 1908. Length 124 to 152 mm.
15312 to 15313. Busin Harbor. March 8, 1909. Length 138 to 140 mm.
14243. Candaraman Island, Balabac. January 4, 1909. Length 132 mm.
16098. Cataingan Bay, Masbate. May 14, 1909. Length 113 mm.
23341. Endeavor Strait, Palawan Island. December 22, 1908. Length 98 mm.
23380. Endeavor Strait. December 23, 1908. Length 128 mm.
7373. Gigoso Point, Quinapundan Bay, Samar Island. July 28, 1909. Length 73 mm.
23248 and 23249. Mantacao Island, west coast of Bohol. April 8, 1908. Length 120 to 140 mm.
10818. Murcielagos Bay, Mindanao. August 20, 1909. Length 121 mm.
23226 and 23227. Oyster Inlet, Ulugan Bay, Palawan Island. December 28, 1908. Length 118 to 138 mm.
16523, 16524, 16526, 16537, 17163, 17164, 23139, 23140. Port Matalvi, Luzon. November 22, 1908. Length 91 to 126 mm.
14603. Port Palapag, East coast Luzon. June 3, 1909. Length 119 mm.
9533 to 9539, 11582. Port Uson, west of Pinas Island. December 17, 1908. Length 95 to 134 mm.
19920. Romblon Harbor. March 25, 1908. Length 120 mm. (449) Dark olive. Scales edged with narrow seal brown line. Breast and lower head pale. Iris with brassy reflections. Sides with irregular dusky bar like blotches. Narrow blackish saddle under axil of second dorsal. Very small peduncular spot. Soft fin dusky, with pale reddish brown wash. Ventral narrowly yellowish at bases.
23569. Romblon Reefs. March 26, 1908. Length 35 to 134 mm. 2 examples.
18635, 18637 to 18640. Saboon Island, Ragay Gulf, Luzon. March 10, 1909. Length 119 to 137 mm.
14312 and 18197. Tara Island, Mindoro Strait. December 14, 1908. Length 120 to 133 mm.
8663 to 8665. Tara Island. December 15, 1908. Length 133 to 140 mm.
23292. Tataan, Simaluc Island. February 19, 1908. Length 132 mm.
14677 and 23234. Tataan, Tawi Tawi Group. February 20, 1908. Length 125 to 134 mm.
7922 and 8696. Tutu Bay, Jolo Island, second anchorage. September 19, 1909. Length 111 to 127 mm.
21509 and 21510. Ulugan Bay, Palawan Island. December 28, 1908. Length 128 to 133 mm.
23348, 23849, 23923, 23924. Togian Bay, Togian Island, Gulf of Tomini, Celebes, Dutch East Indies. November 19, 1909. Length 65 to 104 mm.

AMIA KOILOMATODON (Bleeker)

Apogon koiomatodon BLEEKER, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 134. Ternate.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 234 (copied).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 222 (Seba, Savu Island; Sanguisiapo, Sulu Archipelago; Nusa Laut).

Amia koiomatodon BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 81, pl. (29) 307, fig. 1 (Singapore, Java, Sangir, Ternate, Batjan, Amboina).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 155 (note).

Depth $2\frac{1}{2}$ to $2\frac{4}{5}$; head $2\frac{3}{5}$ to $2\frac{3}{4}$, width $1\frac{7}{8}$ to 2. Snout $3\frac{2}{5}$ to $3\frac{1}{2}$ in head from upper jaw tip; eye 3 to $3\frac{7}{8}$, greater than snout or interorbital but becomes subequal with age; maxillary reaches opposite $\frac{2}{5}$ to $\frac{3}{5}$ in eye, expansion $1\frac{1}{2}$ to $1\frac{3}{4}$ in eye, length 2 to $2\frac{1}{8}$ in head; bands of fine villiform teeth in jaws, on vomer and palatines; interorbital 4 to $4\frac{1}{8}$, nearly level; preopercle ridge and edge denticulate, though former less so or with but few points in young; lower posterior suborbital edge with few serrae with age. Gill rakers 5 + 16, lanceolate, equal gill filaments or $2\frac{1}{4}$ in eye.

Scales 24 or 25 in lateral line to caudal base and 4 or 5 more on latter; 2 or three above, 6 below, 5 or 6 predorsal, 3 rows on cheek to preopercle ridge; muzzle, including maxillary, preorbital and interorbital naked. Scales with 15 to 17 basal radiating striae; 88 to 193 apical denticles with 1 to 10 transverse series of basal elements; circuli fine.

D. VI-I, 9, 1, second spine $1\frac{2}{3}$ to $1\frac{4}{5}$ in total head length, first ray $1\frac{1}{4}$ to $1\frac{1}{3}$; A. II, 8, 1, second spine 2 to $2\frac{2}{5}$, first ray $1\frac{2}{5}$ to $1\frac{1}{2}$; caudal $1\frac{1}{8}$ to $1\frac{1}{5}$, moderately emarginate behind with rounded lobes; least depth of caudal peduncle $2\frac{1}{6}$ to $2\frac{1}{5}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{1}{2}$ to $1\frac{2}{3}$.

Brown above, paler to quite light below. Most examples show median portion of each scale darker on back and upper surface of body, producing a more or less regularly spotted appearance. Small round neutral dusky spot, about size of or smaller than pupil on opercle just above level of pectoral origin. In many examples a variably distinct neutral dusky line from lower hind eye edge to angle or preopercle ridge. Iris with neutral gray tinge. Neutral dusky vertical band extends below bases of first three dorsal spines down to median axis of body, its width equal to two scale exposures. At soft dorsal origin a short neutral dusky vertical bar 1 or 2 scales wide at first and over 1 more scale below so that not quite reaching lateral line. Third neutral dusky transverse band inclined little forward, from bases of last dorsal rays, 2 scales wide and extends below lateral line 1 scale. Sometimes median basal scale in lateral line on caudal dark or emphasized as small dark spot. Spinous dorsal dark, usually terminally. Fins all more or less dusky gray. Upper and lower caudal edges usually narrowly neutral dusky. Often a neutral dusky spot at base of last anal ray on tail, close, small and inconspicuous.

East Indies, Philippines, Polynesia. Our materials differ somewhat from Bleeker's account and figure, especially in the presence of a third dark transverse bar at the origin of the soft dorsal on the back. Its dark opercular spot is another point of difference. The young of this species are much more contrasted than the adult, with the dark spot at the second dorsal origin quite small, the other dark vertical bands extend further down on the side and the third sometimes extends diffusely to the dark spot at the bases of the last anal rays. Also the soft dorsal has a subbasal dark band longitudinally and the soft anal has a basal band of dusky.

7677. Agojo Point, Catanduanes Island, east coast Luzon. June 10, 1909.

Length 133 mm.

16287 and 16288. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909.

Length 130 to 131 mm.

11286, 13718, 16010. Alimango Bay, Burias Island. March 5, 1909. Length

103 to 131 mm.

15263. Atulayan Island, east coast of Luzon. June 18, 1909. Length 136 mm.

14909. Biri Channal, east coast of Luzon. June 2, 1909. Length 136 mm.

14654, 23240 to 23244. Bolalo Bay, Palawan Island. December 21, 1908.

Length 87 to 140 mm.

8874 and 8876. Buang Bay, Talajit Island, between Samar and Masbate.

March 15, 1909. Length 110 to 164 mm.

12459. Bugsuk Island, north Balabac Strait. January 5, 1909. Length 129 mm.

23572. Busin Harbor, Burias Island. April 22, 1908. Length 149 mm.

14544 to 14549, 15817, 17187 to 17189, 22280, 23434. Butuanan Island, east

coast Luzon. June 13, 1909. Length 90 to 143 mm.

14242, 14244, 17418. Candaraman Island, Balabac Strait. January 4, 1909.

Length 112 to 131 mm.

15079. Capulaan Bay, Pagbilao, Chica Island, vicinity Marinduque. February

24, 1909. Length 141 mm.

16709, 21046 and 21047. Capunuyupugan, Generale Island, east coast Mindanao.

May 9, 1908. Length 105 to 125 mm.

One example. Capunuyupugan. May 10, 1908. Length 118 mm.

23641. Caracaran Bay, Batan Island, east coast Luzon. June 8, 1909. Length

112 mm.

12724, 14843, 14845. Casogoran, Malhon Island, between Samar and Leyte

Islands. July 27, 1909. Length 42 to 146 mm.

23994. Cataingan Bay, Masbate Island. April 18, 1908. Length 47 mm.

(565.) Dusky olive. Black bar in front of first dorsal downward to pectoral base; short saddle before second dorsal; bar from axil of second dorsal to anal axil, slightly interrupted below. Round black blotch on lower part of opercle.

Dusky line from under eye across cheek. Top of head with yellowish shades. Fins otherwise with yellowish shades.

9795, 12577, 12578. Caxisigan Island, north Balabac Strait. January 2, 1909.

Length 134 to 141 mm.

8572. Cebu market. April 5, 1908. Length 137 mm.

17724. Cuyo, Cuyo Island. April 9, 1909. Length 117 mm.

109. Endeavor Strait, Malampaya Sound, Palawan Island. December 23, 1908.

Length 90 mm.

6794, 7374, 7375. Gigoso Point, Quinapundan Bay, Samar Island. July 28,

1909. Length 108 to 138 mm.

- 9211 and 9212. Guntao Island, Palawan Passage. December 20, 1908. Length 127 to 148 mm.
- 11090 and 18861. Inamucan Bay, Mindanao Island. August 8, 1909. Length 93 to 150 mm.
- 14349, 23931, 23932. Limbones Cove, Manila Bay, Luzon. February 8, 1909. Length 95 to 142 mm. (1116.) Top of head and back greenish, rest of body pearly. Cross bars blackish. Dusky of fins very dark brown or blackish.
- 23304 and 23305. Machesi Island, vicinity eastern Palawan. April 5, 1909. Length 112 to 125 mm.
7466. Maculabo Island, east coast of Luzon. June 14, 1909. Length 124 mm.
25. Malapascua Island, north of Cebu. March 16, 1909. Length 136 mm.
12134. Malcochin Harbor, Linapacan Island, Linapacan Strait. December 19, 1908. Length 104 mm.
- 12350, 16400, 16401. Mansalay, Mindoro. June 4, 1908. Length 120 to 140 mm.
23250. Mantacao Island, west coast of Bohol. April 8, 1908. Length 137 mm.
14708. Matnog Bay, east coast of Luzon. May 31, 1909. Length 120 mm.
- 9308, 11348, 19435, 19436. Mompog Island, Anabayas Island, vicinity of Marinduque. March 3, 1909. Length 96 to 138 mm.
- 23640, 10819, 10820. Murcielagos Bay, Mindanao. August 20-21, 1909. Length 106 to 140 mm.
- 19867 and 19868. Nabatas Point, Samar Island. July 24, 1909. Length 131 to 152 mm.
- 13445, 19954, 23213, 23214. Opol, Mindanao. August 4, 1909. Length 122 to 154 mm.
- 12848, 16758, 16759, 22083. Pagapas Bay, Luzon. February 20, 1909. Length 137 to 153 mm.
- 279 to 280. Paluan Bay, Mindoro Island. December 11, 1908. Length 139 to 140 mm.
- 11277 to 11279, 17652 to 17654, 23820. Pandanon Island, between Cebu and Bohol. March 23, 1909. Length 74 to 157 mm.
- 10643 to 10654. Polloc, Mindanao. May 22, 1908. Length 79 to 136 mm.
23182. Port Banalacan, Marinduque Island. February 23, 1909. Length 112 mm.
23230. Port Ciego, Balabac Island. January 3, 1909. Length 137 mm.
- 8768, 10358, 10361, 18735. Port Jamelo, Luzon Island. July 13, 1908. Length 124 to 137 mm.
17620. Port Langcan, Dumaran Island, vicinity eastern Palawan. April 8, 1909. Length 125 mm.
- 6733, 16525, 23138. Port Matalvi, off western Luzon. November 22, 1908. Length 112 to 128 mm.
11547. Port Matalvi. November 23, 1908. Length 110 mm.
- 14468, 23268, 23269. Port Palapag, east coast Luzon. June 2, 1909. Length 130 to 140 mm.
- 4614, 14602, 23259. Port Palapag. June 2, 1909. Length 120 to 131 mm.
7799. Port San Pio Quinto, Camiguin Island, China Sea, vicinity Batanes. November 10, 1908. Length 135 mm.
11583. Port Uson, Mayanpayan Island, west of Pinas Island. December 17, 1908. Length 120 mm.
- 18979, 21354, 21511. Quinalasag Island, Masamat Bay, east coast Luzon. June 12, 1909. Length 106 to 133 mm.
- 6406, 6409, 19240. Rasa Island, Mantaquin Bay, Palawan. April 1, 1909. Length 96 to 137 mm. 4 examples.
- 13364, 14788, 21062. Sablayan, Mindoro Island. December 12, 1908. Length 108 to 143 mm.

- 8073 and 8075. Sacol Island, east of Zamboanga. September 9, 1909. Length 79 to 82 mm.
21206. Sianga Bay. March 17, 1908. Length 123 mm.
19553. Singaan Island, between Jolo and Tawi Tawi. September 21, 1909. Length 127 mm.
- 9406 and 9407. Surigao, Mindanao. May 8, 1908. Length 125 to 127 mm.
14213. Taganak Island, Jolo Sea. January 7, 1909. Length 103 mm.
- 15540, 18874. Tilig, Lubang Island, China Sea, vicinity southern Luzon. July 15, 1908. Length 137 to 142 mm.
14518. Ulugan Bay, Rita Island, Palawan. December 29, 1908. Length 143 mm.
19089. Varadero Bay, Mindoro. July 23, 1908. Length 122 mm.
15865. Danawan and Si Amil Islands, vicinity Darvel Bay, Borneo. September 26, 1909. Length 113 mm.
- 17851 and 17852. Bumbum Island, vicinity Darvel Bay, Borneo. September 25, 1909. Length 137 to 143 mm.
24031. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 82 mm.
22727. Talisse Island, north of Celebes. November 9, 1909. Length 135 mm.
13094. Kapoposang Island, Macassar Strait. December 28, 1909. Length 124 mm.
13125. Powati Harbor, Makyan Island, Molucca Passage. November 28, 1909. Length 163 mm.
14340. Tobea Island, Buton Strait. December 14, 1909. Length 135 mm.

AMIA BANDANENSIS (Bleeker)

- Apogon bandanensis* BLEEKER, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. 95. Neira, Banda Island.—GÜNTHER, Cat. Fish Brit. Mus., vol. 1, 1859, p. 238 (copied).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (Manado).—ZUGMAYER, Abh. Bayer. Akad. Wiss. Math. Phys. Kl., vol. 26, pt. 6, 1913, p. 10 (Mekran).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 222 (Savu; Solor; Sanguisiapo, Sulu Archipelago; Menado; Biaru; Siau; Obi major; Atjatuning, west coast New Guinea; South Island Saleyer; east point of Timor; Pepela Bay, Rotti).
- Apogon (Amia) bandanensis* KLUNZINGER, Fische Roth. Meer., 1884, p. 21.
- Amia bandanensis* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 82 (Sumatra, Singapore, Cocos, Bawean, Celebes, Sangir, Flores, Ternate, Batjan, Buru, Obi major, Ceram, Amboina, Goram, Aru); vol. 8, 1876-77, pl. (67) 345, fig. 2.—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 416 (Ternate).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 273 (Philippines); Mem. Bishop Mus., vol. 10, 1928, p. 155 (Samoa, Fiji, Apia, Pago Pago, Kusaie, Mangareva, Guam, Faté, Raiatea, Makatea, Shortland Island, Wake Island, Ponapé, Pelew Islands, type of *Apogon nubilus*).
- Apogon savayensis* GÜNTHER, Proc. Zool. Soc. London, 1871, p. 656. Savaii, Samoan Islands; Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 22, pl. 19, fig. B (Samoa, Tonga, Yap, Tahiti, Celebes).—BEAUFORT, Bijd. Dierk., Amsterdam, 1913, p. 115 (Saoneck, Waigiu).
- Amia savayensis* JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 239, fig. 33 (Apia and Pago Pago, Samoa).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 72 (Bacon).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 497 (Okinawa).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1918, p. 27 (Philippines); Copeia, No. 58, June 18, 1918, p. 63 (Philippines); Bishop Mus. Bull., No. 22, 1925, p. 32 (Samoa).

Apogon nubilus GARMAN, Bull. Mus. Comp. Zoöl., vol. 39, 1903, p. 229. Suva, Fiji.

Apogon gardineri REGAN, Trans. Linn. Soc. London, ser. 12, vol. 12, 1907, p. 227. Cargados Carajos, Indian Ocean, 30 fathoms.

Depth $2\frac{2}{5}$ to $2\frac{4}{5}$; head $2\frac{1}{8}$ to $2\frac{1}{3}$, width 2 to $2\frac{1}{6}$. Snout $4\frac{1}{5}$ to $4\frac{1}{2}$ in head from snout tip; eye $2\frac{1}{8}$ to $2\frac{3}{4}$, greater than snout or interorbital; maxillary $\frac{2}{3}$ to $\frac{3}{4}$ in eye, expansion $2\frac{2}{5}$ to $2\frac{1}{2}$, length $1\frac{3}{4}$ to $1\frac{7}{8}$; teeth villiform, minute, in bands in jaws, on vomer and palatines; interorbital $3\frac{1}{2}$ to $3\frac{3}{4}$, level; preopercle ridge entire, edge minutely serrate. Gill rakers 6 + 20, lanceolate, several more as rudiments above and below; length greater than gill filaments or 2 in eye.

Scales 22 or 23 in lateral line to caudal base and 5 or 6 more on latter; 2 above, 6 below, 3 predorsal, 2 rows of cheek scales; muzzle, including interorbital, maxillary and suborbital, naked. Scales with 14 to 23 basal radiating striae; 85 to 133 apical denticles with 1 or 2 transverse series of basal elements; circuli fine.

D. VII-I, 9, 1, fourth spine 2 to $2\frac{1}{6}$ in total head length, first ray $1\frac{2}{5}$ to $1\frac{1}{2}$; A. II, 8, 1, second spine $2\frac{1}{2}$ to $2\frac{4}{5}$, first ray $1\frac{3}{5}$ to $1\frac{2}{3}$; caudal $1\frac{1}{5}$ to $1\frac{1}{4}$, slightly emarginate behind with lobes rounded; least depth of caudal peduncle $2\frac{1}{4}$ to $2\frac{2}{5}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{3}{4}$ to 2.

Back brown, sides and below greatly paler, often with bright or brassy reflections. Iris pale to gray or neutral gray. Rather obscure brown streak from lower eye down obliquely to angle of preopercle ridge. Usually a more or less distinct and contrasted dusky brown saddle on upper surface of caudal peduncle. Sides usually with traces of vertical, parallel, obscure vertical lines or bars. Spinous dorsal grayish with terminal portion largely anteriorly broadly dark. Soft dorsal pale or grayish with front and upper edges dusky. Caudal gray, darker marginally especially above and below. Other fins pale.

Red Sea, East Africa, India, East Indies, Philippines, Riu Kiu, Micronesia, Polynesia. This species is quite variable as has already been discussed by Fowler (1918). Preserved examples often show a diffuse dark blotch below the soft dorsal. A number of our specimens have the upper edge of second dorsal and caudal, also lower edge of anal and caudal, narrowly whitish. Though Jordan and Seale say "Bleeker is certainly wrong in regarding *savayensis* as the same as *Amia bandanensis*," we do not think so. The color, due to alcohol, is so greatly variable that we feel little hesitation in arranging the large series of specimens below under this species. The description of *Apogon gardineri* Regan also seems to represent *Amia bandanensis*. Though no dark oblique streak is mentioned on the cheek, as this often fades or is very faint at times, it may have faded out. Regan describes it with "faint traces of three dark vertical bars, the first

below the spinous dorsal, the second below the soft dorsal, the third on the caudal peduncle. Spinous dorsal blackish, except posteriorly; ventrals blackish at the tip."

Just what Weber means by his reference to *Apogon batjanensis*⁵ we can not tell. Possibly it may have been intended for *Apogon bandanensis*?

Eleven examples. Batan Island, east of Luzon. June 5, 1909. Length 22 to 70 mm.

Forty-one examples. Batan Island. July 22, 1909. Length 21 to 55 mm.

21863, 23283 to 23286. Biri Channel, Balicuatro Islands. June 1, 1909. Length 68 to 88 mm.

23813 to 23815. Biri Channel. June 2, 1909. Length 31 to 89 mm. 6 examples.

Five examples. Bubuan Island, Jolo. February 14, 1908. Length 64 or 65 mm.

15565. Bugsuk Island, north Balabac Strait. January 5, 1909. Length 54 mm.

16799 and 16804. Busin Harbor, Burias Island. March 7, 1909. Length 56 to 58 mm.

9215. Camp Overton, Mindanao. August 6, 1909. Length 55 mm.

Seven examples. Canmahala Bay, Luzon. March 11, 1909. Length 53 to 60 mm.

23650 to 23658. Caracaran, Batan Island, Luzon. June 8, 1909. Length 43 to 73 mm. 12 examples.

15086 and 15087. Capulaan Bay, Pagbilao Island, Marinduque. February 24, 1909. Length 53 to 60 mm.

23990 to 23993. Cataingan Bay, Masbate. April 18, 1908. Length 51 to 62 mm.

16102. Cataingan Bay. May 14, 1909. Length 66 mm.

18397. Cebu market. April 4, 1908. Length 96 mm.

23505 to 23507. Dalaganem Island, eastern Palawan. April 8, 1909. Length 70 mm.

23340, 23355 to 23357. Endeavor Strait, northwest coast of Palawan. December 22, 1909. Length 61 to 69 mm.

16315. Endeavor Strait. December 23, 1908. Length 77 mm.

16653 and 23365. Galera Bay, Mindoro. June 9, 1908. Length 37 to 74 mm. 3 examples.

7275. Gigoso Point, Quinapundan Bay, Samar Island. July 28, 1909. Length 60 mm.

11867 and 11868, 14428. Gubat Port, Luzon. June 23, 1909. Length 78 to 92 mm.

24060. Iloilo River, shore above. June 2, 1908. Length 64 mm.

23950. Isabel, Basilan Island. September 11, 1909. Length 60 mm.

23698 to 23701. Jolo. March 6-7, 1908. Length 62 to 98 mm.

5310 to 5312. Jolo. March 6, 1908. Length 81 to 92 mm. (412, 414).

(D. 5249). Lanang Point, Davao, Gulf of Davao. May 18, 1908. Length 39 mm.

One example. Mactan Reef. August 31, 1909. Length 23 mm.

5743 to 5745. Mahinog, Camiguin Island. August 3, 1909. Length 72 to 91 mm.

15016 and 23150. Makesi Island, Palawan. April 5, 1909. Length 53 to 79 mm. 9 examples.

8667. Manila Harbor. January 3, 1908. Length 74 mm.

⁵Semon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 263 (Amboina).

- 23254 to 23256. Mantacao Island, west coast of Bohol. April 8, 1908. Length 62 to 73 mm.
23298. Maribojoc Bay, Maribojoc, Bohol. March 26, 1909. Length 42 mm.
23637. Murcielagos Bay, Mindanao. April 21, 1909. Length 87 mm.
- (1043). Nakoda Bay, Palawan Island. December 31, 1908. Length 70 mm.
- 20570, 23215 to 23221. Opol, Mindanao. August 4, 1909. Length 74 to 92 mm.
- 23228 and 23229. Oyster Inlet, Ulugan Bay, Palawan. December 28, 1908. Length 67 to 71 mm.
- Seven examples. Pangasinan Island, vicinity of Jolo. February 13, 1908. Length 36 to 66 mm.
21558. Pilas Island, south of Zamboanga. September 12, 1909. Length 37 to 73 mm. 7 examples.
- One example. Port Banalacan, Marinduque. February 23, 1909. Length 35 mm.
- Five examples. Port Ciego, Balabac. January 3, 1909. Length 46 to 88 mm.
23142. Port Matalvi, Luzon. November 22, 1908. Length 68 mm.
8873. Port Matalvi. November 23, 1908. Length 49 mm.
- 23272 and 23273. Port Palapag. June 2, 1909. Length 65 to 67 mm.
- 15337, 15339, 23362 to 23364. Port Palapag, June 3, 1909. Length 62 to 84 mm. 12 examples.
- 23776 to 23779. Port Uson, west of Pinas Island. December 17, 1908. Length 61 to 73 mm. Iridescent silvery pink. Top of head and 3 saddles across back blackish olive, one saddle below each dorsal and one on hind part of caudal peduncle, last darkest. Triangular bronze blotch below eye, pointing obliquely across cheek. Opercle bronze, with 2 broken silvery vertical bars. Similar indistinct bars on side of body, about 10 between head and axil of dorsal. Chin and lower surface of head paler than above. Fins similar to adjacent body but paler. Caudal with 2 dusky regions on each lobe, one basal and one median.
- 23555, 23868, and 23869. Rapurapu Island, east Luzon. June 22, 1909. Length 51 to 76 mm.
6397. Rasa Island, Mantaquin Bay, Palawan. April 1, 1909. Length 51 to 57 mm. 3 examples.
- Sixteen examples. Romblon. March 25, 1908. Length 62 to 80 mm.
- 14768, 23189, 23190, 23559 to 23564. Romblon. March 26, 1908. Length 62 to 74 mm. 10 examples.
- Four examples. Reef opposite Cebu. April 7, 1908. Length 29 to 40 mm.
- One example. Reef, Sirinao Island. December 31, 1908. Length 42 mm.
- Two examples. Sablayan, Mindoro. December 13, 1908. Length 30 to 39 mm.
- 8072, 14055 and 14056, 15781 and 15782. Sacol Island, east of Zamboanga. September 9, 1909. Length 46 to 70 mm.
23367. Santa Cruz Island, Marinduque. April 24, 1908. Length 50 to 75 mm. 6 examples.
- Five examples. Simaluc, Bisibisi Island. September 23, 1909. Length 23 to 37 mm.
24005. Sitanki Reef. September 24, 1909. Length 80 mm.
- Three examples. Sulade Island, vicinity of Jolo. September 17, 1909. Length 31 to 55 mm.
4642. Tambun Sigumbul, Tonquil Island, south of Zamboanga. September 14, 1909. Length 63 to 66 mm. 2 examples.
23475. Tapiantana Island, south of Zamboanga. September 13, 1909. Length 74 mm.

- Four examples. Tataan, Simulac Island. February 10, 1908. Length 27 to 36 mm.
- 23294, 23295, 23622, 23623. Tataan, Simulac Island. February 19, 1908. Length 54 to 78 mm.
- 23236, 23237. Tataan. February 20, 1908. Length 23 to 71 mm. (164). 6 examples. Dark smoky on back, sides lighter with pearl pink reflections. Snout greenish yellow. Lower preorbital edge golden. Dark line backward across cheek. Blackish band behind middle of caudal peduncle transversely. First dorsal smoky, second dorsal pinkish. Caudal dark basally, terminally paler, tipped with brown. Anal pink. Paired fins very pale pink.
- Six examples. Tataan. February 21, 1908. Length 44 to 70 mm.
24058. Tonquil Island, south of Zamboanga. September 14, 1909. Length 50 to 61 mm. 3 examples.
- 15584, 15585. Tulayan Island, vicinity Jolo. September 15, 1909. Length 60 to 70 mm.
- 16586, 16588. Tulnalutan Island, east of Zamboanga. September 9, 1909. Length 60 to 70 mm.
- 8041, 8042. Tumindao Island, Sulu Archipelago. February 26, 1908. Length 84 to 96 mm.
8695. Tutu Bay, Jolo Island, second anchorage. September 19, 1909. Length 62 mm.
- 23768, 23769. Ulugan Bay, Palawan Island. December 28, 1908. Length 70 to 71 mm.
23957. Danawan and Si Amil Islands, Sibuko Bay vicinity, Borneo. September 26, 1909. Length 60 mm.
23122. Danawan and Si Amil Islands. September 27, 1909. Length 68 mm.
- Three examples. Great Toba Island. December 15, 1909. Length 21 to 31 mm.
- 23896, 23897. Pendek Island. December 15, 1909. Length 66 mm.
14342. Toba Island. December 14, 1909. Length 79 mm.
23619. Tifu Bay, Bouru Island. December 10, 1909. Length 60 mm.
- 23105, 23106, 24079. Tomahu Island. December 11, 1909. Length 48 to 72 mm.
- 23358, 23359. Uki, Bouru Island. December 9, 1909. Length 64 to 83 mm.
- Twenty-nine specimens. Basa Reef, Gulf of Boni, Celebes. December 17, 1909. Length 15 to 41 mm.
23394. Dodepo and Pasejogo Islands, Gulf of Tomini, Celebes. November 16, 1909. Length 87 mm.
23115. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 53 mm.
23974. Limbe Strait, Celebes. November 11, 1909. Length 67 mm.
23847. Togian Bay, Togian Island, Gulf of Tomini, Celebes. November 19, 1909. Length 68 mm.
- 14934, 14935, 23549, 24061. Talisse Island, north of Celebes. November 9, 1909. Length 65 to 73 mm.
- 23613, 23674. Gane Road, Gillolo Island. December 1, 1909. Length 64 to 69 mm.
23484. Kayoa Island. November 29, 1909. Length 80 mm.
- 23527, 23530, 23883, 23884. Tidore Island, south of Ternate. November 25, 1909. Length 55 to 108 mm.

AMIA HARTZFELDII (Bleeker)

Apogon hartzfeldii BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 254. Amboina.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 242 (Amboyna).

Apogon hartzfeldi MARTENS, Preuss. Exp. Ost-Asien, vol. 1, 1876, p. 386 (Ternate).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 223 (Siau; Laiwui).

Amia hartzfeldi BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 86 (Ternate, Buru, Amboina, Goram); vol. 8, 1876-77, pl. (69) 346, fig. 2.—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 417 (Ternate).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 72 (Bacon and Cavite).

Amia hartzfeldii FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 156 (compiled).

Amia cavitensis JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 16, fig. 5. Cavite.

Amia radcliffei FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1918, p. 25, fig. 11. Philippines; 1927, p. 274 (types).

Depth $2\frac{3}{4}$ to 3; head $2\frac{1}{3}$ to $2\frac{3}{5}$, width 2 to $2\frac{1}{8}$. Snout 4 to $4\frac{1}{3}$ in head from snout tip; eye $3\frac{1}{10}$ to $3\frac{2}{5}$, greater than snout or interorbital; maxillary reaches $\frac{2}{3}$ to $\frac{3}{4}$ in eye or opposite hind pupil edge, expansion 2 to $2\frac{1}{5}$ in eye, length 2 in head; bands of minute, villiform teeth in jaws, on vomer and palatines; interorbital $5\frac{1}{2}$ to 6, nearly level; preopercle ridge entire, edge finely and minutely serrate; preorbital entire. Gill rakers 6 + 13, lanceolate, little longer than gill filaments or $2\frac{4}{5}$ in eye.

Scales 21 or 22 in lateral line to caudal base and 4 or 5 more on latter; 2 above, 6 below, 4 predorsal, 2 rows on cheek. Tubes in lateral line simple, well exposed, large, each with well-developed basal scale. Scales with 11 to 13 basal radiating striae; 82 to 114 apical denticles with 3 to 5 transverse series of basal elements; circuli fine.

D. VI-I, 9, 1, third spine 2 to $2\frac{1}{8}$ in total head length, first branched ray $1\frac{3}{5}$ to $1\frac{2}{3}$; A. II, 8, 1, second spine $2\frac{7}{8}$ to $3\frac{3}{5}$, first branched ray $1\frac{7}{8}$ to $2\frac{1}{4}$; caudal $1\frac{1}{3}$ to $1\frac{2}{5}$, little emarginate behind; least depth of caudal peduncle $2\frac{2}{5}$ to $2\frac{3}{5}$; pectoral $1\frac{4}{5}$ to $1\frac{7}{8}$; ventral $1\frac{4}{5}$ to $1\frac{7}{8}$.

Brown generally, head often more or less swarthy. Eye light brown to darker or neutral gray. Pale gray white median line on snout above, forks at interorbital with each branch continued close along profile of back to caudal peduncle above. Outside usually deep brown line passes from snout above, above eye and along upper side of back above lateral line. Obscure deep brown lateral band from snout tip to eye, bounded below on snout by white line, rather obsolete or indistinct on side of body. Round black spot at caudal base medially size of pupil. Fins all more or less dull brown, spinous dorsal darkest; soft dorsal with 1, sometimes 2 longitudinal brown bands basally, anal with 1; caudal with 4 or 5 deep brown bands transversely, usually as spots on membranes.

East Indies, Philippines.

- 15506, 15508. Caracaran, Batan Island. June 8, 1909. Length 100 to 103 mm. (1439). Head pearl gray, with orange brown shades. Pair of dark streaks across interorbital continuing more or less brokenly into pale line running either side of dorsal base, interlacing more or less across top of opercle. Dusky blotch on opercle not distinct. Round black blotch at lateral line. Chin and throat dusky. First dorsal spines more or less silvery, membranes slightly olivaceous. Second dorsal very pale olive, with 2 irregular darker subbasal bands. Caudal pale, membranes with 5 or 6 olive spots, most distinct medially on fin; inner rays somewhat reddish, membranes olivaceous; darker band at base. Pectorals pale reddish.
- 8316, 8590, 16577, 16578, 23193, 23194. Catbalogan, Samar Island. April 15, 1908. Length 55 to 75 mm. (23193, male with buccal ova).
Two examples. Catbalogan. April 15, 1908. Length 36 to 39 mm.
Eleven examples. Catbalogan. April 16, 1908. Length 27 to 67 mm.
18393 to 18396. Cebu market. April 4, 1908. Length 88 to 100 mm.
24068, 24069. Cebu market. August 27, 1909. Length 66 to 70 mm.
(D. 5360). Limbones Cove, Manila Bay. February 8, 1909. Length 65 to 71 mm. Two examples.
- 4487 (D. 5164). Observation Island. S. 82° W. 8 miles (5° 01' 40'' N., 119° 52' 20'' E.), Sulu Archipelago. February 24, 1908. Length 58 mm.
- 14, 23821. Pandanon Island, between Cebu and Bohol. March 23, 1909. Length 80 to 89 mm.
8316. Subig Bay, southern Luzon. January 7, 1908. Length 55 mm.
23422. Tutu Bay, Jolo Island, first anchorage. September 19, 1909. Length 98 mm. (1960). On top of head and back dusky olive generally. Side of body translucent pearl gray, probably darker in life. Narrow white stripe close before spinous dorsal. Black stripe begins just behind point of snout, divides between eyes and continues into broader white stripe at nape, latter running along below dorsal base and ends at caudal base. Pale stripe from snout tip through eye above nearly to angle of gill-opening. Similar one across premaxillary through lower part of eye not extending to opercle, on which black or dusky median blotch. Chin and lower jaw slaty. Spinous dorsal membranes hyaline olive, spines silvery anteriorly. Soft dorsal and anal slightly dusky, latter with somewhat pinkish shade. Caudal pale, with few small olive spots in membranes and black blotch at caudal base chiefly above lateral line. Paired fins hyaline pink, very pale.
- Two examples. Danawan and Si Amil Islands, vicinity of Darvel Bay, Borneo, Dutch East Indies. September 27, 1909. Length 40 to 44 mm.
- Eight examples. Basa Reef, Gulf of Boni, Celebes. December 17, 1909. Length 22 to 39 mm.
- 1 example. Great Tobea Island. December 15, 1909. Length 52 mm.

AMIA CYANOSOMA (Bleeker)

- Apogon cyanosoma* BLEEKER, Nat. Tijds. Nederland. Indië, vol. 5, 1853, p. 71. Lawajong, Solor Island.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 242 (copied).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 20 (Zanzibar).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 714 (Koseir, Red Sea).
- Apogon (Amia) cyanosoma* KLUNZINGER, Fische Roth. Meer., 1884, p. 20 (Koseir).
- Amia cyanosoma* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 87 (Solor); vol. 8, 1876-77, pl. (76) 354, fig. 2.
- Amia magnifica* SEALE, Philippine Journ. Sci., vol. 4, No. 6, 1909, p. 507. Balabac Island.

Depth $2\frac{2}{3}$ to $2\frac{3}{5}$; head $2\frac{1}{4}$ to $2\frac{2}{5}$, width $1\frac{7}{8}$ to 2. Snout $4\frac{2}{5}$ to 5 in head from snout tip; eye $2\frac{1}{2}$ to $2\frac{3}{4}$, much greater than snout or interorbital; maxillary reaches $\frac{3}{4}$ in eye, expansion 3, length 2 to $2\frac{1}{4}$ in head; teeth villiform, in bands in jaws and on vomer and palatines; interorbital 5 to $5\frac{1}{2}$, nearly level; preopercle ridge entire, hind edge finely serrated. Gill rakers 8+16, greater than gill filaments or 2 to $2\frac{3}{4}$ in eye.

Scales 21 to 23 in lateral line to caudal base and 3 or 4 more on latter; 2 above, 6 below, 3 predorsal, 2 rows on cheek; head naked, except cheeks and opercles. Tubes in lateral line large, simple, well exposed, with small crimped basal scale. Scales with 7 to 12 basal radiating striae; 76 to 84 apical denticles with 1 or 2 transverse series of basal elements; circuli fine.

D. VII-I, 9, I, third spine 2 to $2\frac{1}{4}$ in total head length, first ray $1\frac{2}{3}$ to $1\frac{4}{5}$; A. II, 8, I, second spine $2\frac{7}{8}$ to $3\frac{1}{4}$, first ray $1\frac{3}{4}$ to $2\frac{1}{5}$; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, hind edge emarginate; least depth of caudal peduncle $2\frac{4}{5}$ to 3; pectoral $1\frac{3}{5}$ to $1\frac{2}{3}$; ventral $1\frac{3}{5}$ to $1\frac{2}{3}$.

Pale brown generally, lighter below with silvery white sheen, largely with pale lilac tints. Iris silvery gray, little more grayish above. Snout and front more or less deeper brownish than rest of head. Median pale line from interorbital to spinous dorsal. Pale line from each parietal region up and along bases of dorsals and unite behind soft dorsal to form single median line along upper surface of caudal peduncle. Third pale line from snout above, over eye back along lateral line at first to middle of upper caudal lobe basally. Fourth pale line from iris above back over upper postocular region. Fifth pale line over postocular and along median axis of body to caudal base medianly. Sixth pale line from infraorbital to pectoral axil and back along lower face of caudal peduncle to middle of base of lower caudal lobe.

Red Sea, Zanzibar, East Indies, Philippines. Seale described this species as *Amia magnifica*, evidently thinking the structural differences sufficient. As compared with Klunzinger he gives D. VI-I, 8 compared with D. VII-I, 9 and A. II, 7 compared with A. II, 8. Klunzinger gives the color as silvery gray or bluish, with 4 or 5 citron yellow or golden longitudinal bands. Belly, breast and under jaw yellow. On head the longitudinal bands with blue reflections. Bleeker's account varies still more, as D. VII-I, 9 or I, 10 and A. II, 8 or 9. The body is said to be pale blue with 6 longitudinal golden bands and his figure, doubtless colored from the preserved specimen 54 mm. long. Seale's example was but 40 mm.

23379. Alimango Bay, Burias Island. March 5, 1909. Length 41 mm.

12252. Batan Island. June 5, 1909. Length 46 mm.

Three examples. Cataingan Bay, Masbate Island. April 17, 1908. Length 45 to 48 mm.

15945, 15948. Pangasinan Island, vicinity of Jolo. February 13, 1908. Length 51 to 55 mm.

Six examples. Southern Lagoon, Tumindao Island, Sulu Archipelago. February 26, 1908, (317, 318).

23325. Simaluc Island, north of Tawi Tawi. September 22, 1909. Length 40 mm. (1987). Generally translucent pearly. Head and body crossed by about 6 bright orange stripes, first 3 narrow; first along median line of occiput, continued along dorsal base but anterior end with continuation arising some distance before dorsal; second begins behind snout tip, passes above eye and backward to caudal base; third crosses eye above and ends under hind edge of first dorsal; fourth begins on snout, passes through middle of eye, thence backward, ending in scarlet spot at caudal base; fifth crosses premaxillary under eye and backward along lower edge of caudal peduncle to caudal base, symmetrical with second; bands all broader below, where about $\frac{2}{3}$ pupil diameter. Breast and belly with orange wash. Iris silvery except as crossed by dark band. Soft vertical fins very pale hyaline vermilion. Pectorals hyaline pink. Ventrals slightly orange.

One example. Tonquil Island, east of Gumila Reef, south of Zamboanga. September 14, 1909. Length 36 mm.

8039. Tumindao Island. February 26, 1908. Length 57 mm. (male with buccal ova). Also 5 others, same data. Length 50 to 58 mm.

One example. Usadea Island, vicinity of Jolo. March 3, 1908. Length 48 mm.

One example (2040). Talisse Island, north of Celebes. November 9, 1909. Length 44 mm. Golden stripes on pearly grounds, somewhat olivaceous above. Fins vermilion.

AMIA MULTILINEATA (Bleeker)

Apogon multilineatus BLEEKER, Nederland. Tijdschr. Dierk., vol. 2, 1865, p. 188. Ceram.—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 223 (Sanguisapo, Sulu Archipelago).

Amia multilineata BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 82 (Celebes, Sumbawa, Flores, Timor, Ternate, Ceram, Amboina, Goram).—RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 259, pl. 25 (Great Tobea Island, Philippines, Celebes).

Apogon multitaeniatus (not CUVIER) BLEEKER, Journ. Indian Arch., 1848, p. 635 (Sumbawa).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 242 (copied).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (Cebu).

Apogon multitaeniata ELERA, Cat. Fauna Filip., 1895, p. 469 (Cebu).

Amia multitaeniata BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (4) 319, fig. 1.

Depth $2\frac{3}{4}$ to 3; head $2\frac{2}{3}$ to 3, width $1\frac{7}{8}$ to $2\frac{1}{8}$. Snout 4 to $4\frac{1}{5}$ in head from snout tip; eye $2\frac{1}{2}$ to $2\frac{2}{3}$, nearly twice snout or interorbital; maxillary reaches $\frac{2}{3}$ to $\frac{3}{4}$ in eye or about opposite hind pupil edge, expansion $2\frac{1}{2}$ to $2\frac{2}{3}$ in eye, length 2 to $2\frac{1}{5}$ in head; teeth in villiform bands in jaws, on vomer and palatines; interorbital $4\frac{1}{2}$ to 5, nearly level; preopercle ridge entire, edge minutely serrated; preorbital entire. Gill rakers 5+14, lanceolate, much longer than gill filaments or $2\frac{1}{2}$ in eye.

Scales 23 or 24 in lateral line to caudal base and 3 or 4 more on latter; 2 above, 6 below, 3 or 4 predorsal, 2 rows on cheek. Tubes in lateral line large, simple, each well exposed and with small basal scale.

Scales with 9 to 13 basal radiating striae; 50 to 119 apical denticles, with 1 or 2 transverse series of basal elements; circuli moderate.

D. VII-I, 9, 1, third spine $1\frac{3}{5}$ to $1\frac{4}{5}$ in total head length, first branched ray $1\frac{1}{5}$ to $1\frac{1}{3}$; A. II, 8, 1, second spine $2\frac{1}{2}$ to 3, first branched ray $1\frac{3}{5}$ to $1\frac{3}{4}$; caudal 1 to $1\frac{1}{6}$, emarginate behind and lobes rounded; least depth of caudal peduncle $2\frac{1}{10}$ to $2\frac{1}{2}$; pectoral $1\frac{2}{5}$ to $1\frac{2}{3}$; ventral $1\frac{3}{5}$ to $1\frac{4}{5}$.

Brown, slightly paler below or on under surface of head and abdomen. About 12 to 15 dark brown narrow longitudinal lines alternately slightly broader so that broad median one passes through eye to caudal base medially. Side of head and abdomen sometimes with grayish or violet tints. Within alternating pale areas, at least on head, four or five longitudinal gray or white lines follow in their courses, of which at least two cross eye, one above and one below pupil. Iris pale yellowish white to gray or slaty. Fins all pale, spinous dorsal little more grayish and dark gray subbasal line on soft dorsal. Caudal with obscure dusky spot about size of pupil at base medially.

East Indies, Philippines.

15442. Calangaman Island, between Leyte and Cebu. March 16, 1909. Length 59 mm. (1379).

10525. Cebu market. August 17, 1909. Length 66 mm.

10846. Dalaganem Island. April 8, 1909. Length 53 mm.

4347. Jolo. February 14, 1908. Length 38 mm. (D. 5139.)

One example. Jolo. September 16, 1909. Length 18 mm.

4331. Jolo. September 18, 1909. Length 38 mm. (D. 5558).

5314. Jolo Reefs. March 6, 1908. Length 82 mm.

23845, 23846. Pandanon Island. March 23, 1909. Length 65 to 67 mm.

23354. Pangasinan Island, near Jolo. February 13, 1908. Length 64 mm.

23163. Puerta Princesa, Palawan Island. April 5, 1909. Length 62 mm.

23211, 23212. Reefs south lagoon Tumindao Island, Sulu Archipelago. February 26, 1908. Length 70 to 79 mm.

23296, 23870. Tataan, Simaluc Island. February 19, 1908. Length 61 to 66 mm. (159). Ground color olive gray, with many narrow dark olive green stripes irregularly alternate narrower and wider and median one ends in blotch at caudal base. Head yellowish green. Pearl gray through lower eye edge, across snout and on posterior part of head. Similar stripes under eye across cheek and preopercle angle. Posterior and lower parts of head bronze and green. Iris dark. Spinous dorsal with third and posterior membranes yellowish, spines lilac and tips of first 4 or 5 scarlet. Soft fins orange, pectoral very pale, caudal membranes in fork of fin citron yellow and anal with dusky bar at base posteriorly.

One example. Tonquil Island, east of Gumila Bay, south of Zamboanga. September 14, 1909. Length 58 mm.

8040. Tumindao Island. February 26, 1908. Length 71 mm. Male with buccal ova.

23121. Danawan and Si Amil Islands, near Darvel Bay, Borneo. September 27, 1909. Length 63 mm.

23775. Great Tobea Island, Buton Strait. December 15, 1909. Length 20 to 76 mm. 9 examples (2154). Pearl gray, with numerous olive stripes. Side of head olivaceous with white stripe through lower eye from snout extending

to opercle edge, similar one along upper maxillary across to pectoral base. Pale stripes on top of snout and head. Fins very pale scarlet or orange. Brownish bar across second dorsal and anal bases. Other fins without markings.

AMIA ENDEKATAENIA (Bleeker)

Apogon endekataenia BLEEKER, Nat. Tijds. Nederland. Indië, vol. 2, 1852, p. 449. Banka or Lepar.—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 10, 1904, p. 544 (Djibouti, Red Sea).—OGILBY, Proc. Roy. Soc. Queensland, vol. 21, 1908, p. 23 (Green Island, Cairns and Dunk Island).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 225 (Nusa Laut).

Amia endekataenia BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 85, pl. (32) 310, fig. 2 (Singapore, Banka, Bawean, Java).—EVERMANN and SEALE, Bull. Bur. Fishes, vol. 26, 1906 (1907), p. 73 (Bacon).

Apogon novemfasciatus (not CUVIER) SCHLEGEL, Fauna Japon., Poiss., pt. 1, 1842, p. 2, pl. 2, fig. 2.

Apogon schlegeli BLEEKER, Verh. Batav. Genootsch. (Nieu. Jap.), vol. 26, 1854, p. 55 (on SCHLEGEL).

Apogon schlegeli JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 900, fig. 5 (Nagasaki).

Apogon fasciatus (not SHAW) GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 241 (India, Amboyna, Fiji).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 43 (Puynipet, Tahiti, Hong Kong, Java).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 712 (Red Sea).

Apogon (Amia) fasciatus KLUNZINGER, Fische Roth. Meer., 1884, p. 20 (part).

Amia wilsoni FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1918, p. 22, fig. 10. Philippines; Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 274 (types; Philippines).

Depth $2\frac{4}{5}$; head $2\frac{2}{3}$, width 2. Snout 4 in head; eye $2\frac{3}{4}$, greater than snout or interorbital; maxillary reaches opposite eye center, expansion 3 in eye, length $2\frac{1}{8}$ in head; teeth in villiform bands, narrow in jaws, on vomer and palatines; interorbital $4\frac{1}{4}$, level; preopercle ridge entire, edge finely serrated. Gill rakers 7+16, lanceolate, longer than gill filaments or $2\frac{2}{3}$ in eye; 4 above and 4 below rudimentary.

Scales 22 in lateral line to caudal base and 3 more on latter; 2 above, 6 below, 4 predorsal, 2 rows on cheek. Lateral line complete. Scales with 15 basal radiating striae; apical denticles 70 to 86, with 2 or 3 transverse series of basal elements; circuli fine.

D. VIII-I, 9, 1, third spine $1\frac{7}{8}$ in head, first ray $1\frac{2}{5}$; A. II, 8, 1, second spine $2\frac{3}{4}$, second ray $2\frac{1}{8}$; caudal $1\frac{1}{3}$, emarginate; least depth of caudal peduncle $2\frac{1}{4}$; pectoral $1\frac{3}{5}$; ventral $1\frac{2}{3}$.

Pale brown, slightly paler below. Narrow median blackish line from interorbital to spinous dorsal, bordering base of each dorsal and then as single median line on postdorsal. Each side of snout above narrow line extends up over interorbital close above lateral line, fades out on caudal peduncle above. Blackish band from snout tip to eye and median on side to caudal base. Conspicuous blackish spot on caudal base just above lateral line about half size of pupil. Fourth

dark line from lower eye edge to lower surface of caudal peduncle. Fins pale, except dark shade on spinous dorsal terminally. Upper and lower caudal edges slightly dusky.

Red Sea, East Indies, Philippines, China, Japan, Queensland, Polynesia. Described above from the type of *Amia wilsoni*.

47505 A. N. S. P. Philippines. Length 71 mm. Type of *Amia wilsoni*.

AMIA ANGUSTATA Smith and Radcliffe

Amia angustata SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 253, fig. 1. Malanipa Island, east of Zamboanga.

Depth 3; head $2\frac{3}{5}$, width 2. Snout $4\frac{2}{3}$ to $4\frac{2}{3}$ in head; eye $2\frac{7}{8}$ to $3\frac{1}{10}$, greater than snout or interorbital; maxillary reaches $\frac{4}{5}$ to eye, expansion $2\frac{2}{3}$ to $2\frac{2}{3}$ in eye, length $1\frac{7}{8}$ to 2 in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $5\frac{2}{3}$ to 6, level; preopercle ridge entire, edge minutely serrated. Gill rakers 5+14, lanceolate, nearly twice length of gill filaments or $2\frac{1}{4}$ in eye.

Scales 25 in lateral line to caudal base and 3 or 4 more on latter; 2 above, 6 below, 4 predorsal, 3 rows on cheek; head naked, except cheeks and opercles. Tubes of lateral line large, well exposed, each with broad crimped basal scale, at least in anterior part of course. Scales with 10 to 12 basal radiating striae; 67 to 93 apical denticles with 2 or 3 transverse series of basal elements; circuli fine.

D. VII-I, 9, I, third spine $1\frac{7}{8}$ to $2\frac{1}{10}$ in head, second ray $1\frac{1}{2}$ to $1\frac{2}{3}$; A. II, 8, I, second spine $2\frac{3}{4}$ to 3, first ray $1\frac{2}{3}$ to $1\frac{4}{5}$; caudal $1\frac{1}{2}$ to $1\frac{3}{5}$, slightly emarginate behind; least depth of caudal peduncle $2\frac{1}{5}$; pectoral $1\frac{1}{2}$; ventral $1\frac{3}{5}$ to $1\frac{3}{4}$.

Pale brown generally, nearly whitish. Dark brown band along each side of occiput to base of soft dorsal. Second band from over eye back along upper surface of caudal peduncle to base of upper caudal rays. Median lateral dark band from snout through eye to caudal base medially, where ending in round blackish spot little smaller than pupil. Third dark band from infraorbital back to pectoral base and along lower surface of caudal peduncle to caudal base, faint posteriorly. Iris with silvery white bordering lines to dark median band and some gray above and below. Fins all pale to whitish, soft dorsal and anal each with subbasal grayish longitudinal band.

Only known from the Philippines.

24047. Malanipa Island, east of Zamboanga. September 8, 1909. Length 85 mm. (Type No. 68399 U.S.N.M.)

23374. Sipadan Island, off Borneo. September 28, 1909. Length 70 mm.

AMIA FASCIATA (Shaw)

Mullus fasciatus SHAW, Journ. Voy. New South Wales, White, 1790, p. 268, pl., fig. 1. New South Wales.—WALBAUM, Artedi Pisc., vol. 3, 1792, p. 621 (on SHAW).

Apogon fasciatus GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 241 (Australia, Port Jackson).—STEINDACHNER, Sitz. Ber. Akad. Wiss. Wien,

- vol. 53, pt. 1, 1866, p. 427 (Port Jackson).—ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 267 (Cape Grenville and Darnley Island, Queensland).—CASTELNAU, Proc. Linn. Soc. New South Wales, vol. 3, 1878, p. (350) 370 (Port Jackson).—KLUNZINGER, Sitzs. Ber. Akad. Wiss. Wien, vol. 80, pt. 1, 1879 (1880), p. 344 (Port Darwin).—MACLEAY, Proc. Linn. Soc. New South Wales, vol. 5, 1881, p. 343 (Port Jackson and Northern coast).—STEAD, Fishes of Australia, 1906, p. 96 (New South Wales).
- Amia fasciata* BLEEKER, Nederland. Tijdschr. Dierk., vol. 2, 1865, p. 71 (Port Jackson).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 16 (Sydney).—RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 249, pls. 21 and 22 (Port Jackson).—McCULLOCH, Biol. Res. Endeavour, vol. 3, pt. 2, 1915, p. 116 (Tasmania; New South Wales; Moreton Bay, off Port Curtis, Cairns, Murray Island, Mapoon; types of *Apogon cookii* Macleay).
- Apogon cookii* MACLEAY, Proc. Linn. Soc. New South Wales, vol. 5, 1881, p. 344. Endeavour River and Darnley Island, Queensland.
- Amia robusta* SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 254, fig. 2. Jolo Reefs, Philippines, Celebes.
- Amia novemfasciata* (not CUVIER) FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 156 (part).

Depth $2\frac{3}{4}$ to 3; head $2\frac{2}{5}$ to $2\frac{2}{3}$, width $2\frac{1}{10}$ to $2\frac{4}{5}$. Snout 4 to $4\frac{1}{2}$ in head; eye $2\frac{4}{5}$ to $3\frac{1}{5}$, greater than snout or interorbital; maxillary reaches $\frac{3}{5}$ to $\frac{3}{4}$ in eye, expansion 2 to 3, length 2 in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $4\frac{3}{4}$ to $5\frac{1}{2}$, very slightly depressed; preopercle ridge entire, edge finely serrated. Gill rakers 6+11, of which 3 upper rudiments and others lanceolate, greatly more than gill filaments or $2\frac{3}{4}$ in eye.

Scales 24 in lateral line to caudal base and 4 more on latter; 2 above, 6 below, 3 predorsal, 2 rows on cheek; head naked, except cheeks and opercles. Lateral line of large simple tubes, well exposed, each with large crenulated scale, also well exposed. Scales with 11 basal radiating striae; 76 to 130 apical denticles, with 1 or 2 transverse series of basal elements; circuli moderately fine.

D. VII-I, 9, 1, third spine $1\frac{3}{4}$ to $1\frac{1}{2}$ in head, first ray $1\frac{2}{5}$ to $1\frac{1}{2}$; A. II, 8, 1, second spine $2\frac{7}{8}$ to $3\frac{1}{5}$, first ray $1\frac{3}{5}$ to $1\frac{2}{3}$; caudal $1\frac{1}{10}$ to $1\frac{1}{4}$, hind edge emarginate; least depth of caudal peduncle $2\frac{1}{8}$ to $2\frac{1}{3}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{2}{3}$ to $1\frac{3}{4}$.

Brown, hardly lighter below, though some silvery areas in pale bands over abdomen. Dusky brown band along dorsal bases, begins as single dark median band on interorbital. Second dusky brown band begins over snout, extends over lateral line anteriorly and then back to middle of base of upper caudal lobe. Third dusky brown band from snout through eye wide as pupil and follows median axis of body to caudal base. Fourth dusky brown band from infraorbitals to pectoral base, then along lower surface of caudal peduncle to middle of lower caudal lobe, and like two preceding dark bands reflected out over caudal fin. Fifth dusky brown band along lower side of body

to last anal rays basally. Fins all pale brownish, spinous dorsal largely dark terminally, subbasal longitudinal brown band on soft dorsal, another on anal, caudal edged narrowly with brown above and below and ventrals terminally brown. Most examples show median dark lateral band with blackish spot in dark area of caudal base. Others with short dark postocular bar from upper part of iris, but not extending beyond head.

East Indies, Philippines, Australia. Our materials all agree with the account of this species as described and discussed by McCulloch.

Eleven specimens. Batan Island. June 5, 1909. Length 25 to 49 mm.

Three specimens. Batan Island, July 22, 1909. Length 24 to 42 mm.

16057. Canimo Island, near Daet. June 15, 1909. Length 25 to 64 mm. 36 examples.

Sixteen examples. Gubat Bay, Luzon. June 23, 1909. Length 23 to 40 mm.

5315. Jolo Reefs. March 6, 1908. Length 86 mm. (Type of *Amia robusta*, 68400 U.S.N.M.)

5316. Jolo Reefs. March 6, 1908. Length 56 mm.

Six specimens. Maculabo Island, east coast Luzon. June 14, 1909. Length 22 to 43 mm.

One example. Mahinog, Camiguin Island, between Samar and Leyte. August 2, 1909. Length ? (head only). From torch fisherman.

22406. Nogas Point, Panay. February 4, 1908. Length 18 to 22 mm. 2 examples.

Fifty-one examples. Sablayan, Mindoro Island. December 13, 1908. Length 26 to 45 mm.

One example. Sirinao Island reef, southern Palawan. December 31, 1908. Length 35 mm.

20118. Ulugan Bay, near mouth of Baheli River, Palawan. December 28, 1908. Length 68 mm.

Fifty-one examples. Basa Reef, Gulf of Boni, Celebes. December 17, 1909. Length 17 to 37 mm.

AMIA AROUBIENSIS (Hombron and Jacquinot)

Apogon aroubiensis HOMBRON and JACQUINOT, Voy. Astrolabe, Zool., vol. 3, 1853, p. 31, pl. 1. fig. 1. Aroub, Malaysia.

Amia aroubiensis JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 241, fig. 35 (Apia and Pago Pago, Samoa).—RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 25, pl. 22 (Tutu Bay, Philippines, Celebes, Apia).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 157 (Tubuai, Nukuhiva, Raiatea, Apia, Mangareva).

Apogon fasciata aroubiensis McCULLOCH, Biol. Res. Endeavour, vol. 3, No. 3, 1915, p. 118 (Murray Island; Suva, Fiji).

Apogon fasciatus (not WHITE) GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 19, pl. 20, fig. A (part).

Depth $2\frac{3}{4}$ to 3; head $2\frac{1}{2}$ to $2\frac{2}{3}$, width $1\frac{7}{8}$ to $2\frac{1}{6}$. Snout $4\frac{1}{5}$ to $4\frac{1}{2}$ in head from snout tip; eye $2\frac{2}{5}$ to 3, about twice snout or interorbital; maxillary reaches $\frac{3}{4}$ to $\frac{4}{5}$ in eye or to or little beyond hind pupil edge, expansion $2\frac{1}{4}$ to $2\frac{2}{5}$ in eye, length $1\frac{7}{8}$ to $2\frac{1}{8}$ in head; bands of minute villiform teeth in jaws, on vomer and palatines; interorbital $4\frac{1}{2}$ to 6, nearly level; preopercle ridge entire, edge minutely serrate; preorbital entire. Gill rakers 5+16, lanceolate, twice gill filaments or $2\frac{1}{5}$ in eye.

Scales 24 or 25 in lateral line to caudal base and 3 more on latter; 2 above, 6 below, 3 or 4 predorsal, 2 rows on cheek. Tubes in lateral line large, well exposed and each with basal scale. Scales with 10 to 14 basal radiating striae; 58 to 84 apical denticles, with 1 or 2 transverse series of basal elements; circuli moderate.

D. VII-I, 9, I, third dorsal spine $1\frac{3}{4}$ to $1\frac{7}{8}$ in total head length, first ray $1\frac{2}{5}$ to $1\frac{1}{2}$; A. II, 8, I, second spine $2\frac{1}{2}$ to $3\frac{1}{5}$, first ray $1\frac{3}{4}$ to $2\frac{1}{8}$; caudal $1\frac{1}{3}$ to $1\frac{2}{5}$, little emarginate behind, lobes rounded; least depth of caudal peduncle $2\frac{1}{8}$ to $2\frac{2}{5}$; pectoral $1\frac{2}{5}$ to $1\frac{3}{5}$; ventral $1\frac{2}{3}$ to $1\frac{3}{4}$.

Body with four broad blackish brown longitudinal bands, greatly wider than narrow whitish intervening whitish lines or bands; all contracting little on head and more so for three reaching caudal peduncle; median dark band extends from snout tip through eye and forms distinct jet black blotch at middle of caudal at least large as pupil. Fins all pale or whitish, soft dorsal and anal each with broad black basal longitudinal band, extending out little on each fin posteriorly. Iris, except as crossed by dark longitudinal bands pale or whitish.

Malaysia, Philippines, Polynesia.

5177, 5178. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 50 to 55 mm.

15756, 23378. Alimango Bay, Burias Island. March 5, 1909. Length 39 to 46 mm.

19640. Bulan Island, Sanales Group, south of Zamboanga. September 13, 1909. Length 56 mm.

7243, 7244. Busbus Point, Siasi Island, between Jolo and Tawi Tawi. September 20, 1909. Length 44 to 60 mm.

15060, 23094, 24094. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 51 to 58 mm. Two males with buccal ova.

15099, 15100. Capulaan Bay, Pagbilao Island. February 24, 1909. Length 52 to 54 mm.

23646. Caracaran, Batan Island. June 8, 1909. Length 65 mm.

21178. Catbalogan, Samar Island. April 15, 1908. Length 62 mm.

16652, 23366. Galera Bay, Mindoro. June 9, 1908. Length 55 to 59 mm.

23949. Isabel, Basilan Island, South of Zamboanga. September 11, 1909. Length 58 mm.

One example, Ligpo Point, Balayan Bay. January 18, 1908. Length 35 mm.
23916, 23917, 23933 to 23936 (1118). Limbones Cove, Luzon. February 8, 1909. Length 41 to 61 mm.

15662. Mactan Island, between Cebu and Bohol. March 25, 1909. Length 47 mm.

5736, 5737. Mahinog, Camiguin Island, between Leyte and Mindanao. August 3, 1909. Length 52 to 57 mm.

15991. Maricaban Island. January 20, 1908. Length 62 mm.

4569 to 4571. Mompog Island, Anabayas Islands. March 3, 1909. Length 45 to 50 mm.

24085, 24086. Northwest Verde Island. July 22, 1908. Length 57 or 58 mm.

23225. Opol, Mindanao. August 4, 1909. Length 51 mm.

23833. Pandanon Island, between Cebu and Bohol. March 23, 1909. Length 53 mm.

22028. Panpan Point, Tara Island, between Jolo and Tawi Tawi. September 20, 1909. Length 63 mm.
21601. Pasacao, Ragay Gulf, Luzon. March 9, 1909. Length 58 mm.
23767. Pasacao River, Ragay Gulf. March 9, 1909. Length 50 mm.
- One example. Point Ligpo, Balayan Bay. January 18, 1908. Length 35 mm.
- 24087, 24088. Polloc, Mindanao. May 22, 1908. Length 40 to 47 mm.
23178. Port Banalacan, Marinduque Island. February 23, 1909. Length 49 mm.
23781. Port Dupon, Leyte Island. March 17, 1909. Length 51 mm.
- 10321, 10503. Port Maricaban. July 21, 1908. Length 62 to 66 mm.
- 14469, 15340. Port Palapag. June 2-3, 1909. Length 50 to 72 mm.
22866. Rapurapu Island. June 22, 1909. Length 40 mm.
- 23476, 23479. Tapiantana Island. September 13, 1909. Length 39 to 54 mm.
23904. Tataan Island, Tawi Tawi Group. February 21, 1908. Length 51 mm.
- One example. Tataan. February 20, 1908. Length 33 mm.
6144. Tonquil Island, east of Gumila Reef. September 14, 1909. Length 46 mm.
4641. Tonquil Island, Tambun Sigumbul. September 14, 1909. Length 55 mm.
23513. Tulayan Island, vicinity Jolo. September 15, 1909. Length 66 mm.
- 18908, 24066, 24067. Tulnalan Island, east of Zamboanga. September 9, 1909. Length 53 to 56 mm.
- 23169, 23170, 24017. Tutu Bay, Jolo Island, first anchorage. September 19, 1909. Length 50 to 62 mm.
- 7784, 23746 to 23749, 23962 to 23964. Danawan and Si Amil Islands, vicinity Sibuko Bay, Borneo. September 27, 1909. Length 47 to 60 mm. 12 examples.
- 8891 to 8899. Mabul Island, Sibuko Bay, Borneo. September 29, 1909. Length 23 to 63 mm. 13 examples.
- 23372, 23373. Sipadan Island, Sibuko Bay, Borneo. September 28, 1909. Length 57 to 61 mm.
21559. Tifu Bay, Bouro Island, Dutch East Indies. December 10, 1909. Length 62 mm.
- 21210, 21211. Basa Reef, Gulf of Boni, Celebes. December 17, 1909. Length 48 to 61 mm.
- 24028, 24029. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 46 to 52 mm.
16229. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 55 mm.
23396. Dodepo and Pasejogo Islands, Gulf of Tomini, Celebes. November 16, 1909. Length 56 mm.
- 23452 to 23455. Limbe Strait, Celebes. November 10, 1909. Length 54 to 62 mm.
- 23976 to 23980. Limbe Strait, Celebes. November 11, 1909. Length 45 to 64 mm.
- 23502, 23503. Una Una Road, Binang Unang Island, Gulf of Tomini, Celebes. November 17, 1909. Length 50 to 65 mm.
18304. West of Malibagu Point, Celebes. November 21, 1909. Length 62 mm.
- 23447, 23448. Doworra Island, Patiente Strait. December 2, 1909. Length 55 to 58 mm.
- 23488, 23489. Kayoa Island. November 29, 1909. Length 36 to 65 mm.
- 23470, 23471. Maitara Island. November 26, 1909. Length 54 to 68 mm.
23349. Makyan Island. November 29, 1909. Length 65 mm.
- 23109, 23110, 23630, 24011. Powati Harbor, Makyan Island. November 28, 1909. Length 50 to 67 mm.

AMIA NOVEMFASCIATA (Cuvier)

- Apogon novemfasciatus* CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 154. Timor and Guam.—RICHARDSON, Ichth. China, Japan, 1846, p. 221 (China).—PETERS, Arch. Naturg., 1855, p. 234 (Mozambique).—FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 519 (Padang, Sumatra); Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 527 (Padang material).—BEAUFORT, Bijd. Dierk., Amsterdam, 1913, p. 114 (Saonek, Waigiu).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 224 (Savu; Sanguisiapo, Sulu Archipelago; Menado; Biarui; Karakelang; Sabibabu; north Ceram; Saleyer; Nusa Laut; Tuir; High Key; Roma; Timor, Rotti).
- Amia novemfasciata* JORDAN and SEALE, Proc. U. S. Nat. Mus., vol. 28, 1906, p. 777 (Negros); Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 242, figs. 36–37 (Pago Pago and Apia).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 254 (Calayan, Cuyo, Ticao).—RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 251, pl. 23 (Luzon, Celebes, Apia, Fiji).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 497 (Okinawa).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 8 (Guam); Mem. Bishop Mus., vol. 10, 1928, p. 156 (Ponapé, Tomgoa, Society Islands, Kingsmills, Ebon Island, Ascension Island, Fiji, Apia, Samoa, Faté, Tubuai, Guam).
- Amia fasciata novemfasciata* McCULLOCH, Biol. Res. Endeavour, vol. 3, No. 3, 1915, p. 117 (Murray Island; Samoa; New Hebrides; Tongatabu, Friendly Islands; Bougainville Island, Solomons).
- Apogon fasciatus* (not SHAW) QUOY and GAIMARD, Voy. Uranie, Zool., 1825, p. 344 (Guam).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 241 (part).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 43 (Puynipet, Tahiti, Hong Kong, Java).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 20 (Zanzibar and Joanna).—PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 256 (Paracali, Luzon; east of Lauang, Samar).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 712 (Koseir, Red Sea).—GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 19, pl. 20, fig. B (Society Islands; Kingsmill Islands; Apia).—DAY, Fishes of India, pt. 1, 1875, p. 60.—MARTENS, Preuss. Exp. Ost-Asien, 1876, p. 386 (Amboina).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Nagasaki, Japan).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (north Celebes; Cebu).—GORGOSA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 283 (Cebu).—DAY, Fauna Brit. India, vol. 1, 1889, p. 494.—JATZOW and LENZ, Abh. Senckenberg. Naturf. Ges., vol. 21, 1889, p. 500 (Zanzibar).—WEBER, Semon's Zool. Forsch. Reise, vol. 5, 1895, p. 263 (Amboina).—ELERA, Cat. Fauna Filip., 1895, p. 470 (Cebu).—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 416 (Ternate, Batjan; Patani River, Halmahera).
- Amia fasciata* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873–76, p. 87. (Sumatra, Batu, Lepar, Java, Cocos, Bawean, Bali, Celebes, Sangir, Solor, Timor, Ternate, Buru, Ceram, Amboina, Goram, Banda, Aru, Luzon, Samar); vol. 8, 1876–77, pl. (48) 326, fig. 4.—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 72 (Bacon and Samoa).—SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 24 (Zamboanga).
- Apogon (Amia) fasciatus* KLUNZINGER, Fische Roth. Meer., 1884, p. 20.
- Amia balinensis* BLEEKER, Verh. Batav. Genootsch. (Percoid.), vol. 22, 1849, p. 28. Boileling, Bali Island.
- Apogon popur* THIOLLIÈRE, Fauna Woodlark, 1857, p. 143. Woodlark Island.
- Apogon melanotaenia* REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, 1905, p. 321, pl. 3 (c) fig. 4. Charbar, Mekran Coast; Karachi; Nicobars;

Zanzibar; Ann. Durban Mus., vol. 1, pt. 5, 1917, p. 458 (Durban).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 519 (Natal coast 0 to 33 fathoms).

Amia melanotaenia VON BONDE, Fisher. Mar. Biol. Surv. South Africa, Spec. Rep., No. 3, 1922 (1924), p. 13 (off South Africa, 33 fathoms).

Apogon taeniophorus REGAN, Journ. Linn. Soc. London, vol. 12, ser. 2, 1907, p. 226. Maldives.

Depth $2\frac{1}{2}$ to 3; head $2\frac{1}{2}$ to $2\frac{3}{5}$, width 2 to $2\frac{1}{5}$. Snout 4 to $4\frac{1}{2}$ in head from snout tip; eye $2\frac{3}{4}$ to $3\frac{1}{5}$, greatly exceeding snout or interorbital; maxillary reaches $\frac{3}{4}$ to $\frac{4}{5}$ in eye, expansion 2 to $2\frac{1}{4}$, length 2 to $2\frac{1}{8}$ in head; teeth villiform, in narrow bands in jaws, on vomer and palatines; interorbital 5 to $5\frac{1}{2}$, very slightly convex; preopercle ridge entire, edge minutely serrate. Gill rakers 6 + 14, lanceolate, twice gill filaments or 2 in eye.

Scales 24 in lateral line to caudal base and 4 more on latter; 2 above, 6 below, 3 predorsal, 2 or 3 rows on cheek to preopercle angle; muzzle, including suborbitals, maxillary and interorbital, naked. Scales with 12 to 15 basal radiating striae; 70 to 92 apical denticles, with 1 or 2 transverse series of basal elements; circuli moderately fine.

D. VII–I, 8, 1, abnormally IV–I, 7, 1, variably VI–I, 9, 1, second or third spine $1\frac{4}{5}$ to 2 in total head length, second ray $1\frac{1}{2}$ to $1\frac{3}{5}$; A. II, 8, 1, second spine 3 to $3\frac{1}{8}$, second ray $1\frac{3}{4}$ to $1\frac{7}{8}$; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, little emarginate behind; least depth of caudal peduncle $2\frac{1}{8}$ to $2\frac{1}{6}$; pectoral $1\frac{3}{5}$ to $1\frac{3}{4}$; ventral $1\frac{2}{3}$ to $1\frac{7}{8}$.

Pale brown generally, whitish below. Five longitudinal dark bands, medium at median body axis and extends over median caudal rays. Upper and lower dark bands over median approximate over caudal base. Iris silvery white, except as crossed by dark median band. Often dark median band with blackish area below last dorsal rays. Fins all pale, dusky brown basal longitudinal band on soft dorsal and anal, extends well out on last ray posteriorly.

Red Sea, Arabia, East Africa, Zanzibar, Mozambique, Natal, Maldives, India, Nicobars, East Indies, Philippines, Riu Kiu, China, Japan, Melanesia, Micronesia, Polynesia.

24098 to 24100. Batan Island. June 5, 1909. Length 25 to 68 mm. 4 examples.

24104, 24105. Batan Island. July 22, 1909. Length 42 to 45 mm.

24104. Cebu market. August 28, 1909. Length 72 mm.

Five examples. Gubat Bay, Luzon. June 23, 1909. Length 36 to 78 mm.

One example. Pilas Island, south of Zamboanga. September 12, 1909. Length 34 mm.

One example. Sablayan, Mindoro Island. December 13, 1908. Length 47 mm.

23774. San Pascual, Burias Island. March 8, 1909. Length 24 to 68 mm. 2 examples.

Seven examples. Simaluc Sibi Sibi Island, north of Tawi Tawi. September 23, 1909. Length 22 to 39 mm.

Fifteen examples. Basa Reef, Gulf of Boni, Celebes. December 17, 1909. Length 19 to 37 mm.

24081. Labuandata Bay, Gulf of Boni, Celebes. February 21, 1908. Length 42 mm.

24097. Great Tobea Island, Buton Strait. December 15, 1909. Length 47 mm.

AMIA DOEDERLEINI (Jordan and Snyder)

Apogon doederleini JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 901, fig. 6. Nagasaki.

Depth $2\frac{2}{3}$ to 3; head $2\frac{1}{2}$ to $2\frac{2}{3}$, width $1\frac{7}{8}$ to 2. Snout 4 to $4\frac{1}{2}$ in head from snout tip; eye 2 to $2\frac{4}{5}$, greater than snout or interorbital; maxillary reaches $\frac{2}{3}$ in eye, expansion $2\frac{1}{6}$ to $2\frac{1}{2}$, length 2 to $2\frac{1}{6}$ in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital 4 to $4\frac{2}{5}$, very slightly convex; preopercle ridge entire, edge finely serrate. Gill rakers 5 + 14, lanceolate, little longer than gill filaments or $3\frac{1}{8}$ in eye.

Scales 24 in lateral line to caudal base and 4 more on latter; 2 above, 6 below, 3 or 4 predorsal, 3 rows on cheek; head naked, except cheeks and opercles. Tubes in lateral line large, each well exposed and with rather large crimped basal scale. Scales with 9 to 16 basal radiating striae; 12 to 145 apical denticles, with as many as 8 transverse series of basal elements; circuli fine.

D. VII-I, 9, I, third spine 2 to $2\frac{1}{10}$ in total head length, second ray $1\frac{2}{5}$ to $1\frac{1}{2}$; A. II, 8, I, second spine $2\frac{3}{4}$ to 3, first ray $1\frac{3}{4}$ to 2; caudal $1\frac{1}{5}$ to $1\frac{1}{4}$, emarginate; least depth of caudal peduncle $2\frac{1}{2}$ to $2\frac{2}{3}$; pectoral $1\frac{1}{3}$ to $1\frac{2}{5}$; ventral $1\frac{2}{3}$ to $1\frac{4}{5}$.

Dull brown generally, little paler underneath. Dark brown line along bases of dorsals. Second dark brown band from over eye back along upper side of caudal peduncle to caudal base. Median dark band from eye back to caudal base where forming black spot size of pupil. Fourth dark band extends from below eye to pectoral and then back along lower side of caudal peduncle to caudal base. Head all more or less with soiled appearance. Iris dark gray. Fins all brownish, soft dorsal and anal each with subbasal dark longitudinal line.

Originally described from four Japanese specimens and apparently not since reported. Our materials definitely place it in the faunas of both Formosa and the Philippines.

One example. Mompog Island, vicinity Marinduque. March 3, 1909. Length 27 mm.

Fourteen examples. Cataingan Bay, Masbate Island. April 18, 1908. Length 23 to 30 mm.

8408 to 8410. Hokuho, Soo Wan, Formosa. January 29, 1910. Length 109 to 120 mm. (2184). Pearl color with brown stripes. First stripe median, extends from between eyes, dividing around dorsal; second from snout, above orbit to caudal base; median from snout tip interrupted by eye and ending in blotch size of pupil at caudal base mainly above lateral line; fourth across maxillary, under eye through pectoral base and along lower edge of caudal peduncle; fifth short obscure stripe below pectoral. Spinous dorsal pink with

dusky. Soft dorsal brighter, brown bar across base slightly oblique. Anal vermilion, with brown basal bar as on soft dorsal. Caudal reddish dusky. Paired fins pink, ventrals brighter.

AMIA FUSCA (Quoy and Gaimard)

Apogon fuscus QUOY and GAIMARD, Voy. Uranie, Zool., pts. 8-9, Jan. 29-May 26, 1825, p. 345. Guam.—GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 22 (East Indies and Fiji).

Amia fusca JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 244, fig. 38 (Apia).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 159 (Apia).

Apogon cupreus (EHRENBERG) CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 159. Red Sea.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 237 (copied).

Apogon moluccensis VALENCIENNES, Nouv. Ann. Mus. Hist. Nat. Paris, vol. 1, 1832, p. 54. Amboina.—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 229 (Kawa, west Ceram).

Amia moluccensis BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 93 (Sumatra, Singapore, Banka, Cocos, Bawean, Bali, Celebes, Sangir, Timor, Ceram, Amboina, Goram).

?*Apogon guamensis* VALENCIENNES, Nouv. Ann. Mus. Hist. Nat. Paris, vol. 1, 1832, p. 54. Guam.

Apogon chrysopomus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 7, 1854, p. 239. Macassar, Celebes.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 240 (copied).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Singapore).

Amia chrysopoma BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 86 (Singapore, Bawean, Celebes, Amboina); vol. 8, 1876-77, pl. (71) 359, fig. 1.—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907) p. 72 (Bacon).

Amia percaeformis GRAY, Cat. Fish. Gronow, vol. 2, 1854, p. 173. East Indies (On GRONOW, Zoophylac., 1763, No. 273, pl. 9, fig. 2).

Amia sealei FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1918, p. 20, fig. 9. Philippines.—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 24 (Cebu).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 274 (San Fernando, Santa Maria and types); Mem. Bishop Mus., vol. 10, 1928, p. 158, fig. 39 (Shortland Island).

Depth $2\frac{3}{5}$ to $2\frac{7}{8}$; head $2\frac{1}{2}$ to $2\frac{3}{5}$, width $1\frac{7}{8}$ to 2. Snout 4 to $4\frac{1}{5}$ in head; eye $2\frac{1}{2}$ to 3, greater than snout or interorbital; maxillary reaches opposite eye center, expansion $2\frac{3}{4}$ in eye, length $2\frac{1}{10}$ to $2\frac{1}{3}$ in head; bands of villiform teeth in jaws, on vomer and palatines; interorbital 4 to $4\frac{1}{4}$, nearly level; preopercle ridge entire, edge minutely serrate at all ages; preorbital edge entire. Gill rakers 6 + 14, lanceolate, longer than gill filaments or 3 in eye.

Scales 23 in lateral line to caudal base and 5 or 6 more on latter; 2 above, 6 below, 2 to 4 predorsal, 2 rows on cheek. Tubes in lateral line large, simple, well exposed, with crenulate basal scale. Scales with 13 to 18 basal radiating striae; 102 to 157 apical denticles, with 1 to 3 transverse series of basal elements; circuli fine and apical obsolete or anastomosing irregularly.

D. VII-I, 9, I, third spine $1\frac{3}{4}$ to $1\frac{7}{8}$ in total head length, first branched ray $1\frac{1}{3}$ to $1\frac{2}{5}$; A. II, 8, I, second spine $2\frac{2}{3}$ to 3, second

anal ray 2 to $2\frac{1}{10}$; caudal $1\frac{1}{5}$ to $1\frac{1}{4}$, hind edge slightly emarginate, upper lobe often little longer; least depth of caudal peduncle 2 to $2\frac{2}{5}$; pectoral $1\frac{1}{2}$ to $1\frac{3}{5}$; ventral $1\frac{2}{3}$ to $1\frac{7}{8}$.

Light brown generally, becoming paler to whitish below, especially on abdomen and lower surface of head. Head largely brownish above. Iris pale or whitish to deep neutral gray, with dark lateral band crossing. Dark brown line follows along edge of back along bases of both dorsals. Second narrow dark brown line from above eye anteriorly to upper surface of caudal peduncle anteriorly, where fading out. Third broad horizontal deep brown band from snout tip through eye and midway along side to caudal base, though behind eye band narrowing considerably and fading behind. At caudal base and slightly above middle small round black spot, much smaller than pupil and just above tubes of lateral line. Median dark predorsal line from origin of spinous dorsal forward to middle of interorbital. Dorsals grayish-brown, also caudal, other fins paler to whitish. Larger dorsal and anal spines burnished with silvery.

Red Sea, Natal, East Indies, Philippines, Micronesia, Polynesia.

Our numerous examples all agree in the type of coloration described above. In this they differ from Bleeker's figure of *Amia chrysopoma* as that shows only one dark longitudinal line, which extends from above the eye to the caudal peduncle above. Also he shows some dull orange spots on the lower side of the head and three rows of scales on the cheek. Bleeker's figure of *Amia moluccensis* is without any of the usual markings, the spinous dorsal terminally blackish and the cheek with four rows of scales. An examination of the example reported as *Amia fusca* and figured by Jordan and Seale shows it to belong to something different.

Four of our examples from the Cataingan Bay series, 91 to 108 mm. long, taken April 17, 1908, show them to belong to the peculiar condition of buccal incubation. Each has its mouth and pharynx crammed with eggs, some in a well developed stage toward hatching. All these appear to be males. They were easily recognized among the series of specimens by their rather full throats.

21864. Biri Channel, east coast of Luzon. June 1, 1909. Length 106 mm.

16108. Bolalo Bay, Palawan Island. December 21, 1908. Length 87 mm.

14805 to 14807, 15560 to 15562, 15564, 15566. Bugsuk Island, Balabac. January 5, 1909. Length 76 to 102 mm.

15310, 15311, 15314, 16779, 23710, 23711. Busin Harbor, Burias Island. March 8, 1909. Length 81 to 98 mm.

22281, 22283, 23426, 23427. Butauanan Island, east coast of Luzon. June 13, 1909. Length 94 to 97 mm.

14251, 14255. Candaraman Island, Balabac. January 4, 1909. Length 52 to 56 mm.

Twenty-nine examples. Cataingan Bay, Masbate. April 17, 1908. Length 67 to 104 mm. Male with buccal ova.

16852, 23988, 23989. Cataingan Bay. April 18, 1908. Length 76 to 94 mm.

- 16099, 16100, 16107. Cataingan Bay. May 14, 1909. Length 78 to 101 mm.
- 23196 to 23202. Catbalogan, Samar. April 15, 1908. Length 94 to 102 mm. Forty-one examples. Catbalogan. April 16, 1908. Length 97 to 120 mm.
- 15062, (18514, 1306), 23782. Canmahala Bay, Luzon. Length 59 to 93 mm. March 11, 1909. 27 examples.
- 23339, 23498. Endeavor Strait, Palawan Island. December 22, 1908. Length 86 to 92 mm.
- 17334, 17349. Isabel Channel, Basilan Island. September 11, 1909. Length 100 mm.
- 5317 to 5325 (412, 413). Jolo. March 6, 1908. Length 101 to 120 mm. General color pearl gray, washed with yellowish on breast and back somewhat dusky. Top of head smoky. Median longitudinal indistinct dusky stripe, showing somewhat brownish posteriorly on caudal peduncle. Narrow orange brown line around dorsal, forward till between eyes where reddish brown. Second line begins behind snout tip passes above eye as red brown line, breaks into series of orange spots beginning on shoulder; these fuse more or less posteriorly and vanish about anterior or middle of caudal peduncle. Round orange spots on cheek and opercle. Front of upper jaw bluish, continued as line to lower front of eye and narrow brown line above. Iris with bright sapphire shades. First dorsal with yellowish shades, membranes almost lemon; spines gray. Second dorsal washed with greenish yellow. Anal pale, washed with dull cadmium, narrow bluish white subbasal bar contrasts with brighter cadmium basal bar. Pectoral pink. Ventral yellowish, tip of first ray pink.
- 15014, 23148, 23149, 23301 to 23303. Makesi Island, Palawan. April 5, 1909. Length 54 to 92 mm.
- 18571, 24041, 24042. Malanipa Island, east of Zamboanga. September 8, 1909. Length 66 to 71 mm.
17133. Murcielagos Bay, Mindanao. August 20, 1909. Length 107 mm.
- 17649, 23822 to 23824. Pandanon Island. March 23, 1909. Length 102 to 107 mm.
- 15946, 15947. Pangasinan Island, vicinity of Jolo. February 13, 1908. Length 57 to 68 mm.
- Eleven examples. Pangasinan Island. February 13, 1908. Length 62 to 72 mm.
23233. Port Ciego, Balabac. January 3, 1909. Length 77 mm.
17167. Port Matalvi, western Luzon. November 23, 1908. Length 67 mm.
- 24038, 24039 (919). Port Uson, west of Pinas Island. Length 87 to 88 mm. Translucent gray, belly with white shades. Top of head dusky. Side iridescent pink, with longitudinal bronze lines through nape and dividing around dorsals, almost obsolete on caudal peduncle. Bronze line begins at snout, horizontal till beyond dorsals; another through eye and middle of side, ending as three yellow dots on caudal peduncle, also small black basal caudal blotch just above. About 5 bronze orange blotches on opercle, 2 on cheek and third on interopercle. Iris often with purplish shades. First and second dorsal spines iridescent, second membrane yellowish, with black blotch at tip. Second dorsal spines all iridescent; fin orange terminally. Anal and ventral like dorsal. Caudal orange. Pectoral hyaline pink.
- Thirty-six examples. Reefs of South Lagoon, Tumindao, Sulu Archipelago. February 26, 1908. Length 51 to 101 mm.
6400. Rasa Island, Mantaquin Bay, Palawan. April 1, 1909. Four examples. Length 64 to 69 mm.
18641. Saboon Island, Ragay Gulf, Luzon. March 10, 1909. Length 97 mm. One example. Simalue, Bisibisi Island, north of Tawi Tawi. September 22, 1909. Length 69 mm. With isopod crustacean on left predorsal.

17981. Simaluc, Bisibisi Island, north of Tawi Tawi. September 23, 1909. Length 66 mm.
- 23351, 23352. Southern Lagoon, Tumindao Reef, Sulu Archipelago. February 26, 1908. Length 62 mm.
- (D. 5146). Sulade Island, N. 18° W., 3.40 miles (5° 46' 40" N., 120° 48' 50" E.). February 16, 1908. Length 62 mm.
20718. Tambul Sigumbul, Tonquil Island. September 14, 1909. Length 100 mm.
- 23871 to 23874 (153). Tataan, Simaluc Island, Sulu Archipelago. February 19, 1908. Length 61 to 90 mm. Yellowish and pearl gray. Median brown orange occipital line divides and surrounds dorsal. Another line of same shade begins at snout, passes across interorbital and fades out on caudal peduncle above. An interrupted dusky axil stripe begins on snout, becomes blackish at middle of body and chrome yellow on caudal peduncle with small black basal caudal spot above. Broken golden brown stripe across cheek and preopercle to interopercle and few spots on opercle. Iris dusky with sapphire blue shade. Spinous dorsal dusky, first membrane yellowish. Soft dorsal dusky chrome, with yellow tip. Anal whitish, tipped with yellow and orange. Caudal dusky, edged and tipped with pink. Ventral pale yellow, spine and tip of first ray pink.
- 24092 (165). Tataan. February 20, 1908. 10 examples. Length 58 to 90 mm. Two examples. Tonquil Island, south of Zamboanga. September 14, 1909. Length 60 to 62 mm.
- 8026 (346), 8027, 8037 (345), 8038 (344). Tumindao Island. February 26, 1908. Length 62 to 102 mm. Pale olive green with yellowish overshades, in front of vent below white washed with pale chrome. Median brown stripe on forehead surrounding dorsal fins. Another begins at snout tip, passes above eye just above lateral line, ends under and just behind dorsal axil. Third more distinct black line crosses snout and middle of premaxillary, passes backward on axil line and ends as small black blotch at caudal base. Two golden umber bars across opercle and subopercle. Iris with sapphire blue reflections. First dorsal spines washed with opalescent silvery in front, remaining vertical fins pale pink. Pectoral pale pink. Ventral greenish yellow, pinkish toward front. Larger example without bars on opercle but with row of 3 golden umber dots from lower eye edge across cheek to subopercle. Several similar dots on opercle. Axil stripe series of golden dots. Upper stripes brown, also broken into spots. Blue stripe across preorbital.
- 23279, 23423. Tutu Bay, first anchorage, Jolo Island. September 19, 1909. Length 46 to 105 mm. 16 examples.
20693. Ulugan Bay, near Baheli River mouth, Palawan Island. December 28, 1908. Length 96 mm.
- 23345 to 23347. Daisy Island west of Bumbum, Trusan Tando Bulon, British North Borneo. January 6, 1910. Length 92 to 99 mm.
23123. Danawan and Si Amil Islands, Borneo. September 27, 1909. Length 56 mm.
24003. Sitanki Reef, Borneo. September 24, 1909. Length 66 mm.
24076. Tomahu Island, Bouro. December 12, 1909. Length 33 to 68 mm. 12 examples.
- Six examples. Tomahu Island. December 11, 1909. Length 36 to 67 mm.
23400. Dodepo and Pasejogo Islands, Gulf of Tomini, Celebes. November 16, 1909. Length 66 mm.
- 23684 to 23688. Gomomo Island. December 3, 1909. Length 54 to 66 mm.

AMIA QUADRIFASCIATA (Cuvier)

- Apogon quadrifasciatus* CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 153. Pondicherry.—CANTOR, Cat. Malay. Fishes, 1850, p. 3.—PETERS, Arch. Naturg., 1855, p. 234 (Mozambique).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 239 (India, Fiji, China, Australia).—GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 23.—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 43 (Java and Sydney).—DAY, Fishes of India, pt. 1, 1875, p. 59.—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Sarangoon, Singapore; Canton).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (Manila Bay).—DAY, Fauna Brit. India, vol. 1, 1889, p. 494.—ELERA, Cat. Fauna Filip., 1895, p. 470 (Luzon, Manila Bay).—PELLEGRIN, Bull. Soc. Zool. France, vol. 30, 1905, p. 85 (Tonkin).—REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, 1905, p. 330 (Persian Gulf).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 226 (Menado; Saleyer; Timor; Java Sea).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 519 (Mozambique).
- Apogon 4-fasciatus* GORGOZA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 283 (Manila Bay).
- Amia quadrifasciata* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 88 (Singapore, Pinang, Banka, Java, Celebes); vol. 8, 1876-77, pl. (57) 335, fig. 1.—JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 16 (Cavite).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 71 (Jolo).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 254 (Manila); Mem. Carnegie Mus., vol. 6, No. 4, 1909, p. 181 (Takao).—SEALE, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 274 (Sandakan, Borneo).—McCULLOCH, Biol. Res. Endeavour, vol. 3, pt. 3, 1915, p. 120 (Moreton Island, Double Island Point, Frazier Island, Platypus and Harvey Bays, near Gloucester Head, Queensland; Mosman Bay, Port Jackson).—FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines); Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 274 (Jolo and Philippines).
- Apogon monogramma* GÜNTHER, Rep. Voy. Challenger, vol. 1, 1880, p. 38, pl. 16, fig. B. Arafura Sea.
- Amia elizabethae* JORDAN and SEALE, Proc. Davenport Acad. Sci., 1905, p. 9, pl. 4. Hong Kong, China.—SEALE, Philippine Journ. Sci., vol. 9, 1914, p. 63 (Hong Kong).
- Apogon quinquestriatus* REGAN, Journ. Linn. Soc. London, ser. 12, vol. 2, 1907, p. 226. Maldives, South Milandu, 30 to 36 fathoms.

Depth $2\frac{3}{4}$ to $2\frac{4}{5}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width 2 to $2\frac{1}{5}$. Snout $4\frac{1}{3}$ to $4\frac{1}{2}$ in head from snout tip; eye $3\frac{1}{4}$ to $3\frac{2}{5}$, greater than snout or interorbital; maxillary extends till opposite hind pupil edge in adult, little beyond with age, expansion $1\frac{1}{2}$ to 2 in eye, length 2 to $2\frac{1}{8}$ in head; bands of villiform teeth in jaws and a small V-shaped band on vomer, also narrow band may be present on palatines though this often absent; interorbital $4\frac{1}{3}$ to 5, level; preopercle ridge entire, edge finely denticulate. Gill rakers 7+14, lanceolate, longer than gill filaments or 2 in eye.

Scales 24 in lateral line to caudal base and 3 more on latter; 2 or 3 above, 6 below, 5 or 6 predorsal; 2 rows on cheek to preopercle ridge. Tubes in lateral line rather large, well marked and each with small crimped basal scale. Scales with 14 basal radiating striae; 43

to 110 apical denticles, with 1 or 2 series of basal elements; circuli coarse.

D. VII-I, 9, 1, fourth spine $2\frac{1}{6}$ to $2\frac{2}{5}$ in total head length, second ray $1\frac{2}{3}$ to $1\frac{4}{5}$; A. II, 8, 1, second spine 3 to $3\frac{1}{4}$, second ray $1\frac{7}{8}$ to 2; caudal $1\frac{1}{5}$ to $1\frac{1}{4}$, little emarginate behind; least depth of caudal peduncle $2\frac{1}{5}$ to $2\frac{7}{8}$; pectoral $1\frac{2}{3}$ to $1\frac{3}{4}$; ventral $1\frac{3}{4}$ to $1\frac{4}{5}$.

Brown on back and upper surface, sides and below light brown to much paler with silvery white reflections. Dark brown band from snout tip to eye and back little above median axis to caudal base medianly and out over median caudal rays. Another narrower dark brown band parallel above, begins near end of snout above nostrils, runs over eye and along back above toward upper edge of caudal fin. In youngest examples narrow dark brown median line from inter-orbital nearly to spinous dorsal and from each side of occiput, above second dark lateral band, a third dark band or line close along base of spinous dorsal to soft dorsal. Iris pale or whitish, except as crossed by lowest dark longitudinal band. Fins all more or less pale, spinous dorsal grayish terminally, soft dorsal and anal each with subbasal gray-brown longitudinal band, also ventral broadly gray-brown over anterior half of fin.

Persian Gulf, Mozambique, Reunion, Maldives, India, Tonkin, East Indies, Philippines, Formosa, China, Japan, Australia.

Following McCulloch we place *Apogon monogramma* Günther as a synonym, as the former says "only one lateral band is mentioned in its description, but the figure shows two, and some specimens in my series tally very well with the illustration." He also places *Apogon kiensis* Jordan and Snyder as another synonym. We place *Amia elizabethae* Jordan and Seale and *Apogon quinquestriatus* Regan as still other synonyms.

Ten examples. Bacoor, Luzon. June 15, 1908. Length 61 to 83 mm.

20732. Balayan Bay, Taal anchorage, southern Luzon. January 19, 1908.

Length 74 mm.

20387. Catbalogan, Samar. April 10, 1908. Length 58 mm.

23369. Catbalogan. April 15, 1908. Length 59 mm.

5969. Cavite market. December 1, 1908. Length 71 mm.

One example. Cavite and San Roque markets. June 27, 1908. Length 35 mm.

4405. (D. 5099). Corregidor Light, N. 21° E., 4.30 miles (14° $18'$ $40''$ N., 120° $32'$ $40''$ E.), off southern Luzon. In 30 fathoms. January 2, 1908. Length 62 mm.

5542. (D. 5100). Corregidor Light, N. 16° E., 5.70 miles (14° $17'$ $15''$ N., 120° $32'$ $40''$ E.), off southern Luzon. In 35 fathoms. January 2, 1908. Length 28 mm.

(D. 5360). Corregidor Light, N. 74° W., 6.9 miles (14° $21'$ N., 120° $41'$ E.), Luzon. In 12 fathoms. February 8, 1909. Length 46 to 71 mm. 13 examples.

(D. 5361). Corregidor Light, S. 89° W., 7.2 miles (14° $24'$ $15''$ N., 120° $41'$ $30''$ E.), Luzon. In 12 fathoms. February 9, 1909. Length 54 to 78 mm. 6 examples.

Two examples. Hinunangan Bay, Leyte. July 30, 1909. Length 31 to 34 mm.

6949. Iloilo market. May 31, 1908. Length 75 mm.

(D. 5131). Island off Panabutan Point, N. 20° E., 0.04 mile, Sulu Sea, off western Mindanao. In 27 fathoms. February 6, 1908. Length 25 to 90 mm. 44 examples.

(D. 5640). Labuan Blanda Island, N. 88° E. 1 mile (4° 27' 00'' S., 122° 55' 40'' E.), Buton Strait. In 24 fathoms. December 13, 1909. Length 27 mm. 1 example.

Four examples. Manila Bay, Luzon. December 9, 1909. Length 45 to 63 mm.

Four examples. Manila Bay. December 12, 1909. Length 25 to 33 mm.

Seven examples. Manila Harbor. December 31, 1907 and January 1, 1908.

Length 62 to 81 mm. Back dark olive. Median stripe of plum purple from snout tip to fork of caudal, slightly lighter in interspaces of bars on lower side. Narrower lighter stripe begins on snout passes above eye, midway between bases of dorsals and dark median lateral band, and fading out on caudal peduncle. Still above and along bases of dorsals forward to nape a narrow silvery stripe; another silvery stripe between the 2 darker about wide as pupil, becomes very narrow across eye; another silvery stripe across eye and opercle. Lower side silvery, with about 8 dark bars between pectoral base and space opposite hind part of anal, equal in width to interspaces; these bars at times fading to show only very narrow lines corresponding to their margins. Cheek and lower opercle dusky below lowest silvery line. All chin silvery with deep pink iridescence. Throat and branchiostegal membranes white, with greenish reflections. Dorsal spines reddish toward tips. Soft dorsal reddish dusky with darker bars, followed by a dark one of reddish brown. Anal like soft dorsal, but more contrasted. Caudal plain dusky, except median stripe and somewhat darker purplish shades on upper and lower edges. Pectorals nearly colorless. Ventrals reddish-brown except spine, which white, inner margin also lighter, whitish continued on front edge to tip. Food apparently schizopods.

23683. Manila Harbor. January 4, 1908. Length 82 mm.

Six examples. Manila market. December 12 to 18, 1907. Length 71 to 89 mm.

19760 to 19762. Manila market. April 20, 1909. Length 82 to 93 mm. (1534).

(D. 5235). Nagubat Island, S. 58° W., 7 miles (9° 43' N., 125° 48' 15'' E.), east coast of Mindanao. In 44 fathoms. May 9, 1908. Length 48 mm.

4543 (D. 5163). Observation Island, N. 79° W., 6.70 miles (4° 59' 10'' N., 119° 51' E.), Sulu Archipelago. In 28 fathoms. February 24, 1908. Length 42 mm.

(D. 5132). Off Panabutan Point, N. 31° W., 0.50 mile, Sulu Sea off western Mindanao. In 26 fathoms. February 6, 1908. Length 23 to 47 mm. 12 examples.

24080 (D. 5152). Pajumajan Island, S. 2° W., 2 miles (5° 22' 55'' N., 120° 15' 45'' E.), Sulu Archipelago, Tawi Tawi Group. In 34 fathoms. February 18, 1908. Length 40 mm.

(D. 5442). San Fernando Point Light, N. 39° E., 8.4 miles (16° 30' 36'' N., 120° 11' 06''), west coast of Luzon. In 45 fathoms. May 11, 1909. Length 45 to 52 mm. 29 examples.

(D. 5448). San Miguel Point, N. 23° E., 1.5 miles (13° 23' 10'' N., 123° 45' 19'' E.), east coast of Luzon. In 47 fathoms. Length 47 to 63 mm. 6 examples.

(D. 5146). Sulade Island. N. 18° W., 3.40 miles (5° 46' 40'' N., 120° 48' 50'' E.), Sulu Archipelago, vicinity of Siasi. In 24 fathoms. February 16, 1908. Length 38 mm.

One example. Surigao, Mindanao. May 8, 1908. Length 62 mm.

2245. (D. 5478). Tacbuc Point, S. 80° W., 15.2 miles ($10^{\circ} 46' 24''$ N., $125^{\circ} 16' 30''$ E.), Leyte. In 57 fathoms. July 29, 1909. Length 47 to 62 mm.
- (D. 5480). Tacbuc Point, S. 87° W., 17.3 miles ($10^{\circ} 44' 36''$ N., $125^{\circ} 19' \text{E.}$), Leyte. In 62 fathoms. July 29, 1909. Length 58 mm. 1 example.
- 3947 (D. 5156). Tinakta Island, S. 77° W., 3.40 miles ($5^{\circ} 12' 50''$ N., $119^{\circ} 55' 55''$ E.), Sulu Archipelago, Tawi Tawi Group. In 18 fathoms. February 2, 1908. Length 48 mm.
- 4546 (D. 5593). Mount Putri, N. 52° W., 17.2 miles ($4^{\circ} 02' 40''$ N., $118^{\circ} 11' 20''$ E.), Sibuko Bay, Borneo. In 38 fathoms. September 29, 1909. Length 65 mm.
- 23125 to 23128, 23370. Sandakan Bay, Borneo. March 2, 1908. Length 58 to 86 mm. 25 examples.
- Seven examples. Sandakan market, Sandakan, Borneo. March 2, 1908. Length 60 to 75 mm.
- Twenty-two examples (D. 5644). Makasser Island, N. 4° E., 1.3 miles ($5^{\circ} 27' 24''$ S., $122^{\circ} 38' 00''$ E.), Buton Strait. In 22 fathoms. December 16, 1909. Length 21 to 45 mm.
- (D. 5303). China Sea ($21^{\circ} 44'$ N., $114^{\circ} 48'$ E.), vicinity of Hong Kong. In 34 fathoms. August 9, 1909. Length 35 to 50 mm. 21 examples.
- (D. 5304). China Sea ($21^{\circ} 46'$ N., $114^{\circ} 47'$ E.), vicinity of Hong Kong. In 34 fathoms. August 9, 1908. Length 34 to 52 mm. 4 examples.
18855. Hong Kong market. October 19, 1908. Length 104 mm.

AMIA KIENSIS (Jordan and Snyder)

Apogon kiensis JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 905, fig. 9. Wakanoura, Province of Ki, Japan.—JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 231 (Misaki).

Amia kiensis SNYDER, Proc. U.S. Nat. Mus., vol. 42, 1912, p. 412 (Shimizu).—JORDAN and THOMPSON, Mem. Carnegie Mus., vol. 6, No. 4, 1914, p. 247, fig. 20 (Misaki).—SEALE, Philippine Journ. Sci., vol. 9, 1914, p. 64 (Hong Kong).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 26 (Philippines).

Depth $2\frac{3}{4}$ to $2\frac{3}{4}$; head $2\frac{1}{4}$ to $2\frac{1}{2}$, width $2\frac{1}{4}$ to $2\frac{1}{3}$. Snout $4\frac{1}{2}$ to 5 in head from snout tip; eye $3\frac{1}{4}$ to $3\frac{3}{5}$, greater than snout or interorbital; maxillary reaches $\frac{3}{4}$ to $\frac{4}{5}$ in eye or about opposite hind pupil edge, expansion $1\frac{7}{8}$ to 2 in eye, length $1\frac{1}{10}$ to 2 in head; villiform teeth in bands in jaws, on vomer and present or absent on each palatine; interorbital $5\frac{1}{5}$ to $5\frac{1}{2}$ in head, nearly level; preopercle with ridge entire, hind edge minutely denticulate; preorbital entire. Gill rakers 7+15, lanceolate, greatly longer than gill filaments or $1\frac{3}{5}$ in eye.

Scales 22 or 23 in lateral line to caudal base or 4 more on latter; 2 above, 6 below, 5 or 6 predorsal; 2 rows on cheek. Tubes in lateral line large, well exposed and each with small basal scale. Scales with 11 or 12 basal radiating striae; 80 to 82 apical denticles, with 2 to 4 transverse series of basal elements; circuli moderately fine.

D. VII-1, 9, 1, third spine $2\frac{1}{4}$ to $2\frac{1}{3}$ in total head length, first branched ray $1\frac{2}{5}$ to $1\frac{1}{2}$; A. II, 8, 1, second spine 3 to $3\frac{1}{4}$, first branched ray $1\frac{3}{4}$ to $1\frac{4}{5}$; caudal $1\frac{1}{5}$ to $1\frac{1}{3}$, little emarginate behind; least depth of caudal peduncle $2\frac{3}{4}$ to 3; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{1}{2}$ to $1\frac{3}{5}$.

Light brown, paler below, side of trunk and head with silvery sheen. Deep brown median lateral band from snout tip, through eye to caudal and out over fin medially. Another deep brown band above medial from above opercle to upper surface of caudal peduncle, narrower. Iris pale or whitish with neutral gray above, except where crossed by medial dark lateral band. Fins all pale brownish, dorsals slightly dusted with deeper brown; soft dorsal and anal each with deep brown subbasal longitudinal line or narrow band, extending little outward or posteriorly on fins.

Philippines, China, Japan.

Six examples (D. 5361). Corregidor Light, S. 89° W., 7.2 miles (14° 24' 15'' N., 120° 41' 30'' E.), Manila Bay, Luzon. February 9, 1909. Length 65 to 80 mm.

AMIA KALLOPTERA (Bleeker)

Apogon kallopterus BLEEKER, Act. Soc. Sci. Ind. Néerland. (Manado), vol. 1, 1856, p. 33. Manado, Celebes.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 241 (copied).—REGAN, Ann. Durban Mus., vol. 1, pt. 3, 1916, p. 168 (Durban, Natal).—GILCHRIST and THOMPSON, Ann. Durban Mus., vol. 1, 1917, p. 340 (compiled).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 519 (Natal coast).

Amia kallopterus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 89 (Celebes and Sangir); vol. 8, 1876-77, pl. (59) 337, fig. 2.

Amia kalloptera JORDAN and RICHARDSON, Bull. B. ur. Fisher., vol. 27, 1907 (1908), p. 255 (Fuga Island).—FOWLER, Copeia, No. 58, June 1918, p. 63 (Philippines).

Depth $2\frac{3}{5}$ to 3; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width 2 to $2\frac{1}{5}$. Snout $3\frac{2}{5}$ to 4 in head; eye $2\frac{4}{5}$ to $3\frac{1}{3}$, 1 to $1\frac{1}{3}$ in snout or greater in young, greater than interorbital; maxillary reaches opposite eye center, expansion $2\frac{1}{5}$ to 3 in eye, length $2\frac{1}{5}$ to $2\frac{1}{4}$ in head; bands of fine villiform teeth in jaws, on vomer and palatines; interorbital $4\frac{4}{5}$ to 5, nearly level; preopercle ridge and edge denticulate. Gill rakers 5+14, of which 2 or 3 uppermost and 4 lowermost rudimentary tubercles; longest little greater than gill filaments or 2 in eye.

Scales 23 in lateral line to caudal base and 6 or 7 more out over latter; 3 above, 7 below, 5 predorsal, 2 rows on cheek to preopercle ridge. Tubes in lateral line simple, rather large and well exposed, each with crimped basal scale. Scales with 13 to 21 basal radiating striae; 93 to 112 apical denticles, with 1 to 7 transverse series of basal elements; circuli fine.

D. VII-I, 9, 1, third spine $1\frac{2}{3}$ to $1\frac{7}{8}$ in total head length, second ray $1\frac{1}{2}$ to $1\frac{3}{5}$; A. II, 8, 1, second spine $2\frac{7}{8}$ to 3, first ray $1\frac{2}{3}$ to $1\frac{3}{4}$; caudal $1\frac{1}{5}$ to $1\frac{1}{4}$, moderately emarginate behind; least depth of caudal peduncle $2\frac{1}{4}$ to $2\frac{2}{5}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{1}{2}$ to $1\frac{2}{3}$.

Brown generally, little paler below. On back and sides above each scale more or less edged with darker brown to form reticulated pattern. Diffuse dark brown band, at first narrow along side of snout and through eye, broadens on costal region to about $\frac{2}{3}$ diameter of eye

and finally fades out on caudal peduncle. At caudal base, largely if not entirely above lateral line, rounded neutral dusky blotch about size of pupil, well contrasted. Iris, except as crossed by dark lateral band, whitish. Many examples with more or less drab gray on lower surface of head. Spinous dorsal largely neutral blackish terminally, especially so along front border, basally fin whitish. Soft dorsal neutral gray largely over terminal portion, membranes darker than fin rays and whitish base defined by subbasal longitudinal neutral dusky band. Caudal grayish, rays paler and upper and lower edges darker. Anal like soft dorsal only paler and subbasal dusky longitudinal band more contrasted. Pectoral pale or whitish. Ventral with front portion broadly brownish dusky, rest whitish.

Natal, East Indies, Philippines, Formosa.

- 16289, 16290. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 92 to 96 mm.
23377. Alimango, Burias Island. March 5, 1909. Length 54 mm.
23490. Balikias Bay, Lubang Island. July 14, 1909. Length 97 mm.
- 15080, 15089. Capulaan Bay, Pagbilao, Chica Island. February 24, 1909. Length 96 to 105 mm.
4684. Galvaney Island, Ragay Gulf, Luzon. March 9, 1909. Length 97 mm.
12696. Gondra Island, between Jolo and Tawi Tawi. September 20, 1909. Length 103 mm.
- 11908, 12244. Lampinigan Island, south of Zamboanga. September 11, 1909. Length 97 to 100 mm.
- 23914, 23925 to 23929. Limbones Cove, Manila Bay, Luzon. February 8, 1909. Length 82 to 99 mm. (1117). Generally reddish brown or pearly. Dusky band from about snout tip to caudal. Spinous dorsal with an oblique bar through middle of first membrane and tip of second; tip of first pearly and pearly bar underneath black, remainder of fin dusky olive, spines pale. Second dorsal rays pale pink, tips of posterior ones black, with dashes of black on last 5 or 6 membranes and more or less pronounced dusky bar near base of fin. Caudal and anal pink, black bar at base of latter, tips narrowly dusky in both. Pectorals clear pink. Ventrals pink, first membranes pearly, second dusky.
5134. Little Santa Cruz Island, Zamboanga. May 28, 1908. Length 63 mm.
- 8888, 8890. Mabul Island, east of Zamboanga. September 9, 1909. Length 64 to 97 mm.
- 16000 and 16001. Mactan Cove, Mactan Island, off northern Cebu. April 6, 1908. Length 60 to 93 mm.
- 15206, 15665, 19818. Mactan Island, between Cebu and Bohol. March 25, 1909. Length 100 to 105 mm.
- Two examples. Magnaas, Lagonoy Gulf, east coast of Luzon. June 17, 1909. Length 110 to 112 mm.
- 16145, 16146. Mahinog, Camiguin Island. April 3, 1909. Length 111 to 121 mm.
- 15013, 15015. Makesi Island, eastern Palawan. April 5, 1909. Length 98 to 111 mm.
- 26, 6198, 20029 to 20032. Malapascua Island, north of Cebu. March 16, 1909. Length 94 to 111 mm.
15901. Mansalay, Mindoro. June 4, 1908. Length 99 mm.
- 23251 to 23253. Mantacao Island, west coast of Bohol. April 8, 1908. Length 74 to 111 mm.

23299. Maribojoc Bay, Maribojoc, Bohol Island. March 26, 1909. Length 70 mm.
- 4572, 4573, 16985, 19434. Mompog Island, Anabayas Islands. March 3, 1909. Length 97 to 102 mm.
17683. Murcielagos Bay, Mindanao. August 9, 1909. Length 117 mm. Twenty-six examples. Opol, Mindanao. August 4, 1909. Length 69 to 116 mm.
22084. Pagapas Bay, Luzon. February 20, 1909. Length 98 mm.
- 23818, 23819, 23825 to 23830. Pandanon Island, between Cebu and Bohol. March 23, 1909. Length 37 to 106 mm.
23353. Pangasinan Island, Jolo. February 13, 1908. Length 88 mm. 10639 to 10642. Polloc, Mindanao. May 22, 1908. Length 84 to 96 mm. One example. Polloc. December 22, 1908. Length 39 mm.
- 23179, 23181. Port Banalacan, Marinduque. February 23, 1909. Length 77 to 101 mm.
14367. Port Caltom, Busuanga Island. December 15, 1908. Length 119 mm.
23232. Port Ciego, Balabac. January 3, 1909. Length 86 mm.
- 8767, 10362. Port Jamelo, Manila Bay, Luzon. July 13, 1908. Length 59 to 106 mm.
22741. Port Maricaban, southern Luzon. July 21, 1908. Length 113 mm.
- 22249, 23141. Port Matalvi, western Luzon. November 22, 1908. Length 112 to 117 mm.
- 14597, 14599, 14600, 15338, 23260, 23261, 23270, 23271. Port Palapag, eastern Luzon. June 3, 1909. Length 99 to 113 mm.
- 23157 to 23160. Puerta Princesa, eastern Palawan. April 5, 1909. Length 77 to 114 mm.
23570. Romblon reefs. March 26, 1908. Length 59 mm.
- 23679 to 23681, 23472 to 23474. Tapiantana Island, south of Zamboanga. September 13, 1909. Length 68 to 88 mm.
23239. Tataan Island, Simaluc Island, Tawi Tawi Group. February 20, 1908. Length 98 mm.
23906. Tataan Island. February 21, 1908. Length 80 mm.
- 18781, 18782. Tictauan Island, east of Zamboanga. September 8, 1909. Length 72 to 95 mm.
10378. Tilig, Lubang Island, vicinity southern Luzon. July 15, 1908. Length 89 mm.
5938. Sabtan Island. November 8, 1908. Length 114 mm.
- 13362, 13363, 13365, 15397, 15398. Sablayan, Mindoro. December 12, 1908. Length 88 to 103 mm.
- 8074, 8076. Sacol Island, east of Zamboanga. September 9, 1909. Length 80 to 93 mm.
23368. Santa Cruz Island, Marinduque. April 24, 1908. Length 70 mm.
- 23327, 23331. Simaluc Island, north of Tawi Tawi. September 22, 1909. Length 73 to 104 mm.
- 19551, 19556, 23405, 23406. Singaan Island, between Jolo and Tawi Tawi. September 21, 1909. Length 68 to 122 mm.
- 6149, 24059. Tonquil Island, east of Gumila Reef, south of Zamboanga. September 14, 1909. Length 71 to 82 mm. 3 examples.
- 8020, 8030 (331), 8031 (332), 8032. Tumindao Reef, Sulu Archipelago. February 26, 1908. Length 88 to 106 mm. Dusky above, with more or less translucence, scale edges seal brown, central bases of row above lateral line blotched with same; ground color becomes pearly and pink below with dusky basal blotches on scales. Blackish axil band from snout tip through eye to caudal peduncle where indistinct, ending in black blotch less than eye on

caudal base. Iris dark with gold stripes above and below. Spinous dorsal yellowish green, black bar on membranes from base of first spine to tip of fourth. Soft dorsal with membranes greenish, blotched with darker, rays with dusky pink, tips black, increasing in depth posteriorly. Caudal dusky pink, membranes with greenish shades and edges of lobes darker. Anal like caudal in general color, very dark greenish bar at base. Pectorals very pale pink. Ventral rays pinkish, spine and front white, membrane and second ray darker green.

18907. Tunalutan Island, east of Zamboanga. September 9, 1909. Length 97 mm.
23277. Tutu Bay, Jolo Island, first anchorage. September 19, 1909. Length 57 to 112 mm. 7 examples.
15541. Rita Island, Ulugan Bay, Palawan Island. December 29, 1908. Length 103 mm.
10411. Varadero Bay, Verde Island, vicinity southern Luzon. July 22, 1908. Length 100 mm.
19050. Varadero Bay. July 23, 1908. Length 93 mm.
6433. West coast of Palaui Island, off northern Luzon. November 18, 1908. Length 95 mm.
- 14136, 23576, 23579 to 23583, 23614, 23615. Tifu Bay, Bouro Island. December 10, 1909. Length 54 to 110 mm.
- 18258, 23107, 23317, 23318. Tomahu, Bouro Island. December 11, 1909.
- 14486 to 14488, 24077. Tomahu. December 12, 1909. Length 34 to 97 mm. 35 examples.
23360. Uki Island, Bouro Island. December 9, 1909. Length 62 mm.
- 15866, 23958. Danawan and Si Amil Islands, vicinity Darvel Bay, Borneo. September 26, 1909. Length 79 to 90 mm.
- 23384, 23744. Danawan and Si Amil Islands. September 27, 1909. Length 80 to 86 mm.
- 12786, 14862, 23395. Dodepo and Pasejogo Islands, Gulf of Tomini, Celebes. November 16, 1909. Length 85 to 98 mm.
- 23116 to 23118. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 60 to 88 mm.
- 12786, 20040, 23457, 23458, 23971, 23973. Limbe Strait, Celebes. November 10, 1909. Length 57 to 96 mm.
- 23550, 23940. Talisse Island, north of Celebes. November 9, 1909. Length 84 to 89 mm.
- 23499 to 23501. Una Una Road, Binang Unang Island, Celebes. November 17, 1909. Length 47 to 100 mm.
- 23306, 23414. Gane Road, Gillolo Island. December 1, 1909. Length 95 to 105 mm.
- 23151, 23152, 23350. Makyan Island. November 29, 1909. Length 75 to 104 mm.
- 23631 to 23633. Powati anchorage, Makyan Island. March 28, 1909. Length 97 to 104 mm. (23632 with isopod crustacean.)
12478. Powati anchorage. November 25, 1909. Length 117 mm.
- 24006, 24007, 13836, 23113, 23114, 23287 to 23289. Powati anchorage. November 28, 1909. Length 92 to 109 mm.
23312. Gomomo Island, Pitt passage. December 3, 1909. Length 88 mm.
- 23485, 23486. Kayoa Island. November 29, 1909. Length 87 to 96 mm.
23469. Maitara Island. November 26, 1909. Length 83 mm.
- 23522, 23523 to 23526, 23879 to 23882, 12943. Tidore Island, south of Ternate. November 25, 1909. Length 68 to 116 mm.
11160. Nan Wan Bay, Formosa. January 25, 1910. Length 122 mm.

AMIA EXOSTIGMA Jordan and Seale

Amia exostigma (JORDAN and STARKS) JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905, p. 238, fig. 31. Apia and Pago Pago, Samoa.—FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines); Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 274 (Philippines).

Amia frenata (not VALENCIENNES) FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 157 (note).

Depth $2\frac{7}{8}$ to 3; head $2\frac{2}{5}$ to $2\frac{2}{3}$, width $2\frac{1}{8}$ to $2\frac{1}{5}$. Snout $3\frac{7}{8}$ to 4 in head; eye 3 to $3\frac{1}{3}$, greater than snout or interorbital; maxillary reaches $\frac{2}{5}$ in eye, expansion $2\frac{3}{5}$ to 3, length $2\frac{1}{3}$ to $2\frac{2}{5}$ in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $5\frac{1}{4}$ to $6\frac{1}{2}$, nearly level; infraorbital and preopercle edges and ridge of latter, denticulated. Gill rakers 4+12, lanceolate, equal gill filaments or $\frac{1}{3}$ of eye.

Scales 23 or 24 in lateral line to caudal base and 3 to 5 more on latter; 2 above, 6 below, 4 predorsal, 2 rows on cheek; head naked except cheek and opercles. Tubes in lateral line moderate, well exposed though short and each with short basal scale. Scales with 10 to 14 basal radiating striae; 56 to 119 apical denticles, with 1 to 4 transverse series of basal elements; circuli fine.

D. VII-I, 9, 1, third spine 2 to $2\frac{1}{8}$ in head, second ray $1\frac{1}{2}$ to $1\frac{3}{4}$; A. II, 8, 1, second spine 3 to $3\frac{1}{4}$, third ray $1\frac{7}{8}$ to $2\frac{1}{8}$; caudal $1\frac{1}{3}$ to $1\frac{2}{5}$, emarginate; least depth of caudal peduncle $2\frac{2}{5}$ to $2\frac{1}{2}$; pectoral $1\frac{2}{5}$ to $1\frac{2}{3}$; ventral $1\frac{3}{4}$ to $1\frac{4}{5}$.

Brown, paler to quite light below. Silvery and brassy tints on sides of abdomen. Blackish brown line from snout tip to eye, then broadly through latter and over postocular along median axis of body to caudal base and as it narrows posteriorly only dark line at caudal base. Close above tubes of lateral line on caudal base, small round dark spot, less than pupil in size. Fins grayish to pale brownish. Spinous dorsal little more brownish or dusky terminally. Soft dorsal and anal each with subbasal deep brown longitudinal line, also upper and lower caudal edges each with dark brown line. Sometimes the dark axial longitudinal band is absent from the trunk and tail in preserved examples.

Philippines, Polynesia.

15563. Bugsuk Island, Balabac. January 5, 1909. Length 95 mm.

14253, 14254. Candaraman Island, Balabac. January 4, 1909. Length 74 to 88 mm.

15507, 23642. Caracaran, Batan Island. January 8, 1909. Length 90 to 94 mm.

16854. Cataingan Bay, Masbate Island. April 18, 1908. Length 95 to 98 mm.

(555.) Pearl gray, with reddish tints more pronounced on lower surface. Lower head, breast and belly thickly punctulated with small brownish specks, smallest on head. Dark brown stripe from premaxillary through eye to caudal base and small brown blotch above its posterior end. Iris with yellow. Dorsal body color. Brown bar across front of first dorsal, including first spine

- upward to tip of third membrane. Other vertical fins like body but with pinkish shades. Paired fins dusky pink.
23930. Limbones Cove, Luzon. February 8, 1908. Length 92 mm. (1129). Pearly with dusky shades. Pronounced dark band from snout to near caudal base, at latter superiorly small round black blotch. Oblique narrow brown stripe across front of first dorsal, including all of first spine and terminal half of third membrane. Other fins very pale pink. Dusky bar across base of second dorsal and anal, includes last rays and these and margins of vertical fins more or less dusky.
24045. Malanipa Island, east of Zamboanga. September 8, 1909. Length 60 mm.
- 23816, 23817, 23831, 23832. Pandanon Island, between Cebu and Bohol. March 23, 1909. Length 73 to 80 mm.
23274. Port Palapag. June 2, 1909. Length 93 mm.
14598. Port Palapag. June 3, 1909. Length 105 mm.
- One example. Rasa Island, Mantaquin Bay, Palawan. April 1, 1909. Length 50 mm.
23188. Romblon. March 26, 1908. Length 88 mm.
- 23342, 23343. Romblon Harbor. March 25, 1908. Length 72 to 90 mm.
- 15778, 15779. Sacol Island, east of Zamboanga. September 9, 1909. Length 58 to 72 mm.
- 23207 to 23210. South Lagoon, Tumindao Island. February 26, 1908. Length 77 to 95 mm.
18783. Tictauan Island, east of Zamboanga. September 8, 1909. Length 65 mm.
- 8036, 8303. Tumindao Island. February 26, 1908. Length 78 to 93 mm. Male with buccal ova.
- 23173, 23174. Tutu Bay, Jolo Island, first anchorage. September 19, 1909. Length 70 to 95 mm.
23119. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 77 mm.
- 23889, 23890. Pendek Island, Buton Strait. December 15, 1909. Length 61 to 71 mm.

AMIA FRAENATA (Valenciennes)

- Apogon fraenatus* VALENCIENNES, Nouv. Ann. Mus. Hist. Nat. Paris, vol. 1, 1832, p. 57, pl. 4, fig. 4. New Guinea and Guam.
- Apogon frenatus* GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 241 (Fiji); Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 19, pl. 19, fig. A (Hawaiian, Society, and Tuamotu Islands).—DAY, Fishes of India, pt. 1, 1875, p. 58, pl. 16, fig. 4.—PETERS, Monatsb. Akad. Wiss. Berlin, 1876, p. 436 (Mauritius).—DAY, Fauna Brit. India, vol. 1, 1889, p. 493.—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1903, p. 416 (Ternate and Batjan).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 227 (Biaru, Salibabu, west Ceram).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 518 (Natal coast, Mozambique).
- Apogon (Pristiapogon) fraenatus* KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 715 (Koseir, Red Sea); Fische Roth. Meer., 1884, p. 22.
- Amia frenata* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873–76, p. 89 (Celebes, Ternate, Batjan, Buru, Ceram, Amboina, Goram, New Guinea); vol. 8, 1876–77, pl. (64) 342, fig. 2.—FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines); Bishop Mus. Bull., No. 22, 1925, p. 8 (Guam), p. 25 (Honolulu); No. 26, 1925, p. 13 (Johnston Island and French Frigates Shoal); No. 38, 1927, p. 12 (French Frigates Shoal and Kahoolawe Island); Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 274 (Philippines); Mem. Bishop Mus., vol. 10, 1928, p. 157 (Oahu, Honolulu, Hanalei Bay,

- Makemo, Mangareva, Papeete, Laysan, Samoa, Apia, Shortland Island, Faté, Raiatea, Tubuai, Nukubiva, French Frigates Shoal, Johnston Island, Guam, Society Islands, Apiang, Maui, type of *Apogon snyderi*).
- Amia fraenata* EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 71 (Bacon).
- Apogon vittiger* BENNETT, Proc. Zool. Soc. London, vol. 1, 1833, p. 32. Mauritius.—REGAN, Trans. Linn. Soc. London, vol. 12, ser. 2, 1907, p. 225 (Coetivy, Seychelles Group).
- Apogon melanorhynchus* BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 255. Wahi, North Ceram.
- Apogon melanorhynchus* WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 227 (Nusa Laut and Low Key).
- Amia melanorhynchus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 90 (Singapore, Bawean, Celebes, Ternate, Buru, Ceram, Amboina); vol. 8, 1876-77, pl. (65) 343, fig. 1.
- Apogon endekataenia* (not BLEEKER) DAY, Fishes of India, pt. 1, 1875, p. 59, pl. 16, fig. 1.
- Apogon fasciatus* (not SHAW) DAY, Fauna Brit. India, vol. 1, 1889, p. 494 (part).
- Apogon snyderi* JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 22, 1902 (1903), p. 180. Honolulu and Hilo; vol. 23, pt. 1, 1903 (1905), pl. 36 (type).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 527 (Hawaiian Islands).
- Amia snyderi* JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 22, pt. 1, 1903 (1905), p. 214 (Honolulu and Hilo).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 237 (Apia and Pago Pago).
- Apogon menesemus* JENKINS, Bull. U. S. Fish Comm., vol. 22, 1902 (1903), p. 448, fig. 19. Honolulu.—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 527 (Hawaiian Islands).
- Apogon evanidus* FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 518. Padang, Sumatra; Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 527 (type).
- Apogon holotaemia* REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, 1905, p. 319 (331). Muscat, in 15 to 30 fathoms.
- Amia bifasciata* (not RÜPPELL) FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines).

Depth 3 to $3\frac{1}{2}$; head $2\frac{1}{2}$ to $2\frac{2}{3}$, width 2 to $2\frac{1}{5}$. Snout 4 to $4\frac{1}{8}$ in head; eye 3 to $3\frac{1}{3}$, greater than snout or interorbital; maxillary reaches $\frac{1}{2}$ to $\frac{3}{5}$ in eye, expansion $2\frac{3}{5}$ to $2\frac{4}{5}$ in eye, length 2 to $2\frac{1}{8}$ in head; bands of villiform teeth in jaws, on vomer and palatines; bony interorbital 5 to $6\frac{1}{4}$, nearly level; preopercle ridge and edge finely serrated, also lower edge of narrow infraorbitals. Gill rakers 4+13, of which 2 above and 4 below rudimentary, others lanceolate or equal gill filaments, which 3 in head.

Scales 22 or 23 in lateral line to caudal base and 3 or 4 more on latter; 2 above, 6 below, 4 predorsal, 2 rows on cheek to preopercle ridge; head, except cheeks and opercles, naked. Scales with 10 or 11 basal radiating striae; 10 to 90 short apical denticles in 1 or 2 series; circuli moderate.

D. VII-I, 9, 1, fourth spine $2\frac{1}{5}$ to $2\frac{2}{5}$ in head, first ray $1\frac{2}{3}$ to $1\frac{1}{5}$; A. II, 8, 1, second spine $2\frac{4}{5}$ to $3\frac{1}{5}$, first ray 2 to $2\frac{1}{4}$; caudal $1\frac{1}{3}$ to

1½, slightly emarginate behind; least depth of caudal peduncle 2½ to 2¾; pectoral 1½ to 1¾; ventral 1⅞ to 1Ⅹ.

Pale brown, much lighter below, whitish silvery reflections on opercles, breast and space below pectorals. Iris whitish, except as crossed by horizontal dark blackish-brown band extending from snout tip to caudal base medianly, narrowing to line on caudal peduncle posteriorly and forms rounded spot size of pupil on caudal base. Fins all pale; dorsals slightly pale brownish, broadly dusky brown over anterior half, soft dorsal and anal each with subbasal longitudinal or horizontal dark band; upper and lower caudal edges narrowly dark; front ventral edges broadly brown.

Red Sea, Mozambique, Natal, Mauritius, Seychelles, India, East Indies, Philippines, Micronesia, Polynesia, Hawaii.

23376. Alimango Bay, Burias Island. March 5, 1909. Length 52 mm.

14250. Candaraman Island, Balabac Island. January 4, 1909. Length 60 mm.

(D. 5360). Corregidor Light, N. 74° W., 6.9 miles (14° 21' N., 120° 41' E.), Manila Bay, Luzon. In 12 fathoms. February 7, 1909. Length 77 mm.

23508. Dalaganam Island, vicinity of eastern Palawan. April 8, 1909. Length 55 mm.

17347, 17348, 17350. Isabel, Basilan Island, south of Zamboanga. September 11, 1909. Length 85 to 97 mm.

23714. Labuan Blanda Island, N. 88° E., 1 mile (4° 27' 00'' S., 122° 55' 40'' E.), Buton Strait. In 24 fathoms. December 14, 1909. Length 55 mm.

18570, 24040, 24043, 24044, 24046. Malanipa Island, south of Zamboanga. September 8, 1909. Length 56 to 85 mm. (1911). Translucent pearly.

Dusky stripe across snout through eye and backward to caudal, disappearing in death except on head. Caudal with dusky spot. Front of spinous dorsal obliquely dusky. Front of soft dorsal whitish, terminal and vertical edges blackish. Anal like soft dorsal but less marked. Caudal tip blackish.

One example. Port Dupon, Leyte Island. March 17, 1909. Length 27 mm.

Four examples. Port Jamelo, Luzon. July 13, 1908. Length 67 to 92 mm.

12661. Port San Pio Quinto, Camiguin Island, China Sea, vicinity Batanes. November 10, 1908. Length 70 mm.

8301, 8302. San Miguel Island, Tobacco Bay, east coast Luzon. June 4, 1909. Length 54 to 59 mm.

12697. Tara Island, Mindoro Strait. December 14, 1908. Length 83 mm.

24013. Tara Island. December 15, 1908. Length 72 mm.

14012. West coast Palaui Island, off northern Luzon. November 18, 1908. Length 73 mm.

(D. 5595). Zamboanga Light, N. 31° W., 0.1 mile (6° 54' 00'' N., 122° 04' 30'' east), Mindanao. In 9 fathoms. October 6, 1909. Length 22 to 27 mm.

8889. Mabul Island, vicinity of Sibuko Bay, Borneo. September 29, 1909. Length 51 mm.

23108. Tomahu Island, vicinity of Bouro Island. December 11, 1909. Length 60 mm.

Two examples. Tomahu Island. December 12, 1909. Length 63 to 77 mm.

13672, 23459 to 23462. Limbe Strait, Celebes. November 10, 1909. Length 65 to 76 mm.

23969, 23970, 23972. Limbe Strait. November 11, 1909. Length 57 to 85 mm.

Two examples. Makasser Island, Celebes. December 16, 1909. Length 29 to 35 mm.

13834, 13835, 23111, 23112, 23291, 23634, 24008. Powati Harbor, Makyan Island, Molucca Passage. November 28, 1909. Length 74 to 93 mm.

AMIA COMPRESSA Smith and Radcliffe

Amia compressa SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 246, pls. 20-21. Port Matalvi, west coast of Luzon; Quinalasag Island, east coast of Luzon; Philippines; Borneo; Moluccas.—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 157 (Shortland Island).

Amia fasciata compressa McCULLOCH, Biol. Res. Endeavour, vol. 3, pt. 3, 1915, p. 118 (Malay Archipelago and Bougainville Island, Solomons).

Depth $2\frac{2}{5}$ to $2\frac{3}{5}$; head $2\frac{2}{5}$ to $2\frac{4}{5}$, width $1\frac{7}{8}$ to 2. Snout 4 to 5 in head from snout tip; eye $2\frac{1}{2}$ to $2\frac{7}{8}$, much greater than snout or interorbital; maxillary reaches opposite eye center, expansion $2\frac{3}{5}$ to $2\frac{3}{4}$ in eye, length $1\frac{7}{8}$ to 2 in head; teeth minute, in villiform bands in jaws, on vomer and palatines; interorbital $3\frac{1}{4}$ to 4, nearly level; preopercle ridge entire, edge finely denticulate; preorbital entire. Gill rakers 8 + 19, lanceolate, little longer than gill filaments or $2\frac{1}{4}$ in eye.

Scales 23 or 24 in lateral line to caudal base and 4 or 5 more on latter; 2 above, 6 below, 4 or 5 predorsal; 2 rows on cheek. Tubes in lateral line large, simple, well exposed, each with small basal scale. Scales with 10 to 12 basal radiating striae; 80 to 125 apical denticles, with 1 or 2 transverse series of basal elements; circuli fine.

D. VI-I, 9, 1, third spine $1\frac{4}{5}$ to 2 in total head length, first branched ray $1\frac{1}{5}$ to $1\frac{1}{4}$; A. II, 9, 1 (spines abnormally absent), second spine $2\frac{1}{3}$ to $2\frac{3}{4}$, first branched ray $1\frac{3}{4}$ to $1\frac{7}{8}$; caudal $1\frac{1}{8}$ to $1\frac{1}{4}$, little emarginate behind; least depth of caudal peduncle $1\frac{7}{8}$ to 2; pectoral $1\frac{1}{4}$ to $1\frac{1}{3}$; ventral $1\frac{1}{2}$ to $1\frac{3}{5}$.

Pale brown generally, slightly lighter below, also with brassy on sides and abdomen. Head often little more brownish than body and bright reflections on opercle. Iris pale yellowish to brownish, with neutral gray to slaty. Head and body with six broad blackish brown longitudinal bands; uppermost begins at middle of interorbital, extends along predorsal, each side of dorsal bases and along upper surface of caudal peduncle medially; second band greatly broader, bifurcate anteriorly and fusing below spinous dorsal; third band similarly broad, from eye to middle of caudal base; fourth band from little below eye, narrower than two above, includes pectoral base then to bases of lower caudal rays; fifth and sixth bands paler and successively narrower, along lower side of abdomen till above anal fin. Bifurcation of second longitudinal band often appears broken below front of spinous dorsal in lower branch. Bands also break as several small spots at caudal base. Fins all pale brownish; spinous dorsal with diffuse dusky brown oblique bar from origin to behind end of third spine; soft dorsal and anal with basal dusky streak, upper or dorsal less marked or only deeply colored posteriorly, at which point

both extend outward on fins; soft dorsal also with dark front margin. Upper and lower caudal edges dusky narrowly. Paired fins uniformly pale.

East Indies, Philippines. Allied with *Amia fasciata* (White) and its allies, but differs chiefly in the presence of but six dorsal spines.

14844. Alimango Bay, Burias Island. March 5, 1909. Length 93 mm.

20489. Batan Island. June 5, 1909. Length 74 mm.

23280 to 23282, 23435 to 23438, 23465, 23466. Biri Channel. June 1, 1909. Length 67 to 99 mm.

14910, 14911, 23463, 23464. Biri Channel. June 2, 1909. Length 86 to 94 mm. Eleven examples. Biri Channel. June 2, 1909. Length 65 to 102 mm.

17029 to 17031. Bisucay Island near Cuyo Island. April 9, 1909. Length 93 to 98 mm. (Type [17030 Bureau of Fisheries] 68398 U.S.N.M.)

14655 to 14659. Bolalo Bay, Palawan Island. December 21, 1908. Length 82 to 94 mm.

Two examples. Bolalo Bay. December 21, 1908. Length 34 to 40 mm.

16778. Busin Harbor, Burias Island. November 7, 1909. Length 98 mm.

15816. Butaanan Island. June 12, 1909. Length 95 mm.

23432, 23433. Butaanan Island. June 13, 1909. Length 84 to 85 mm.

23643 to 23645. Caracaran, Batan Island. June 8, 1909. Length 71 to 88 mm.

Three examples. Caracaran. June 8, 1909. Length 32 to 36 mm.

23995. Cataingan Bay. April 18, 1908. Length 51 mm.

8494 to 8496. Catbalogan, Samar Island. April 16, 1908. Length 95 to 105 mm.

6860. Caxisigan Island, north Balabac Strait. January 2, 1909. Length 79 mm.

23332 to 23338. Endeavor Strait. December 22, 1908. Length 50 to 85 mm.

227. Endeavor Strait. December 24, 1908. Length 83 mm.

23693. Gomomo Island. December 3, 1909. Length 43 mm.

17337 to 17343, 23943 to 23945. Isabel, Basilan Island. September 11, 1909. Length 83 to 98 mm.

5740. Mahinog, Camiguin Island. August 3, 1909. Length 102 mm.

15001 to 15003, 15008, 15009, 15012, 16903 to 16906, 23144 to 23147, 23390.

Makesi Island, Palawan. April 5, 1909. Length 63 to 100 mm.

Six examples. Makesi Island. Length 65 to 86 mm.

23257, 23258. Mantacao Island, west coast of Bohol. April 8, 1908. Length 99 to 101 mm. (23258 male with buccal ova).

15495. Masamat Bay, Quinalasag Island. June 12, 1909. Length 88 mm.

23224. Opol, Mindanao. August 4, 1909. Length 100 mm.

Three examples. Oyster Inlet, Ulugan Bay. December 28, 1908. Length 81 to 87 mm.

Eleven examples. Philippines. Length 32 to 96 mm.

8766. Port Jamelo, Luzon Island. July 13, 1908. Length 70 mm.

23143. Port Matalvi, Luzon Island. November 22, 1908. Length 100 mm.

One example. Port Palapag. June 2, 1909. Length 31 mm.

14604, 23263 to 23267. Port Palapag. June 3, 1909. Length 72 to 89 mm.

23780. Port Uson, west of Pinas Island. December 17, 1908. Length 80 mm.

(811). Alternate dark red brown and silvery stripes. Snout and lower head blackish. Fins reddish brown. First dorsal dusky anteriorly; second dorsal with indistinct blackish basal bar. Anal with distinct blackish basal bar.

Fifteen specimens. Rapurapu Island. June 22, 1909. Length 66 to 91 mm.

24102, 24103. Rasa Island, Mantaquin Bay, Palawan Island. April 1, 1909. Length 59 to 61 mm.

14767, 14769, 23183 to 23187, 23344. Romblon. March 26, 1908. Length 48 to 90 mm.

21063. Sablayan, Mindoro Island. December 12, 1908. Length 85 mm.
 15776. Sacol Island. September 9, 1909. Length 85 mm.
 24000, 24001. Sitanki Reef. September 24, 1909. Length 54 to 88 mm.
 23134 to 23137. Surigao, Mindanao. May 8, 1908. Length 71 to 93 mm.
 23297. Tataan, Sinaluc Island. February 19, 1908. Length 79 mm.
 Fourteen examples. Tataan. February 19, 1908. Length 48 to 87 mm.
 24089. Tataan. February 20, 1908. (167.) Reddish brown stripes, approaching vermilion below. Breast pink. First of stripes at base of dorsal row of spots, interspaces olive; lower interspaces pearly. Throat blackish. Iris with sapphire reflections. Front of dorsal spines with golden shades, rays pink. Dusky bar at soft dorsal base, turning upward on vertical edge. Anal pink, dusky bar at base turning down near vertical edge. Caudal pink, edges dusky. Pectoral pink.
 One example. Tataan Pass, Tawi Tawi. February 21, 1908. Length 72 mm.
 10891. Tilig, Lubang. July 15, 1908. Length 98 mm.
 15580 to 15582, 23572, 23514. Tulayan Island. September 15, 1909. Length 52 to 91 mm.
 23275, 23276, 23420, 23421. Tutu Bay, Jolo Island, first anchorage. September 19, 1909. Length 93 to 100 mm.
 23770. Ulugan Bay, Palawan Island. December 28, 1908. Length 58 mm.
 10, 23960, 23961. Danawan and Si Amil Islands, vicinity Darvel Bay, Borneo, Dutch East Indies. September 26, 1909. Length 75 to 86 mm.
 23517, 23616. Tifu Bay, Bouro Island. December 10, 1909. Length 41 to 86 mm.
 23314 to 23316. Tomahu Island. December 11, 1909. Length 96 to 102 mm.
 24027. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 90 mm.
 24036. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 52 mm.
 14417, 23544 to 23546, 23913, 23939. Talisse Island, north of Celebes. November 9, 1909. Length 84 to 101 mm.
 23682, 23900 to 23903. Talisse Island. February 21, 1908. Length 65 to 74 mm.
 23860, 23861. Togian Bay, Togian Island. November 9, 1909. Length 74 to 76 mm.
 23444, 23446. Doworra Island. December 2, 1909. Length 50 to 80 mm.
 23603 to 23605. Gane Road, Gillolo Island. December 1, 1909. Length 68 to 89 mm. 4 examples.
 23487. Kayoa Island. November 29, 1909. Length 95 mm.
 9773, 23468. Maitara Island. November 26, 1909. Length 100 to 107 mm.
 23153 to 23156, 23348. Makyan Island. November 29, 1909. Length 105 to 112 mm. (23156 male with buccal ova).
 24012. Tara Island. December 15, 1909. Length 95 mm.
 23534 to 23536, 23875, 23876, 23878. Tidore Island, south of Ternate. November 25, 1909. Length 53 to 105 mm.
 One example, no data. Length 98 mm.

AMIA MARGARITOPHORA (Bleeker)

Apogon margaritophorus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 7, 1854, p. 363. Batjan.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 234 (copied).—PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 256 (Pulo brani, Singapore).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Saragoon River, Singapore).—BEAUFORT, Bijd. Dierk., Amsterdam, 1913, p. 115 (Macassar).

Amia margaritophora BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 94, pl. (23) 301, fig. 4 (Singapore, Bawean, Batjan).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 74 (Bacon).

Depth $2\frac{3}{4}$ to $2\frac{4}{5}$; head $2\frac{1}{2}$ to $2\frac{3}{5}$, width $2\frac{1}{5}$ to $2\frac{1}{4}$. Snout $3\frac{2}{3}$ to $4\frac{1}{8}$ in head from snout tip; eye $2\frac{7}{8}$ to 3, greater than snout or interorbital; maxillary reaches $\frac{2}{5}$ to $\frac{1}{2}$ in eye, expansion $1\frac{7}{8}$ to 2, length 2 to $2\frac{1}{8}$ in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $4\frac{1}{2}$ to $4\frac{2}{3}$, nearly level; preopercle ridge entire, edge minutely denticulate. Gill rakers 7+17, lanceolate, of which 3 uppermost and 3 lowermost rudiments, longer than gill filaments or $1\frac{1}{2}$ in eye.

Scales 21 or 22 in lateral line to caudal base and 3 more on latter; 2 above, 4 below, 4 predorsal, 2 rows on cheek to preopercle ridge; muzzle, including maxillary, suborbitals and whole top of head naked. Lateral line with enlarged tubes, each with small basal scale. Scales with 10 to 17 basal radiating striae; 64 to 109 apical denticles, with 1 or 2 transverse series of basal elements; circuli fine.

D. VII-I, 9, 1, third spine $1\frac{1}{2}$ to $1\frac{3}{5}$ in total head length, first ray $1\frac{2}{5}$ to $1\frac{1}{2}$; A. II, 8, 1, second spine $2\frac{1}{3}$ to $2\frac{2}{3}$, first ray $1\frac{3}{4}$ to $1\frac{4}{5}$; caudal $1\frac{1}{5}$ to $1\frac{1}{4}$, emarginate; least depth of caudal peduncle $2\frac{7}{8}$ to 3; pectoral $1\frac{3}{5}$ to $1\frac{2}{3}$; ventral $1\frac{2}{5}$ to $1\frac{3}{5}$.

Brown, paler on under surface of head and abdomen in which region also silvery white tint. Five whitish horizontal lines begin on head, also all less in width than darker interspaces; first above eye begins in middle of interorbital where forming a V-shaped mark; second above eye and back toward upper edge of caudal peduncle; third on upper side of snout through eye, broadens on body, back to middle of upper half of caudal base; fourth from lower side of snout through eye back to middle of lower half of caudal base, broadens on body and broken as series of whitish blotches; fifth from end of maxillary to caudal base and back along side of abdomen. Iris whitish. Fins all pale or gray, membranes of spinous dorsal dusky.

East Indies, Philippines.

Three examples. Beach at village near Chase Head, Endeavor Strait, Palawan.

December 22, 1908. Length 38 to 42 mm.

16579, 23195. Catbalogan, Samar Island. April 15, 1908. Length 42 to 49 mm.

Three examples. Cebu market. March 20, 1909. Length 45 to 52 mm.

One example. Cebu market. March 28, 1909. Length 51 mm.

Fourteen examples. Cebu market. August 28, 1909. Length 46 to 57 mm.

Five examples. Mactan Island. August 31, 1909. Length 32 to 43 mm.

Three examples. Malcochin Harbor, Linapacan Island. December 19, 1908.

Length 34 to 39 mm. (948). Bright silvery gray, crossed by bright orange brown stripes; one through eye and median on side to caudal; similar one from snout below eye to caudal; narrower stripe from pectoral base along anal base uniting on lower edge of caudal peduncle; one from snout above eye following outline of back, ends at caudal base; shorter stripe below, behind

eye, merges with other under space between dorsals; dorsal stripe median surrounding fin; two median bright stripes connected by 8 narrow transverse bars, sometimes reducing silvery interspaces to circular spots. Spinous dorsal yellowish, second membrane orange; second dorsal, anal and caudal pink; paired fins pink, pectorals paler.

One example. Port Jamelo, Luzon Island. July 13, 1908. Length 44 mm. (679). Yellowish olive above, pale below. Broad dark stripe through eye from snout tip to caudal; another parallel from tip of mandible and connected through middle of side by eight cross bars with upper dark stripe, inclosing rounded, oblong, silvery spaces. Branch from opercle across pectoral base along abdominal region, below anal base uniting as median line under caudal peduncle. Two narrow stripes on upper side and like most of others tinted with reddish bronze. Narrow black line on back below dorsal. Vertical and paired fins reddish. Second dorsal spine yellow, membrane crimson dotted with black.

Four examples. Reef opposite Cebu. April 7, 1908. Length 20 to 24 mm. (510). Stripes dull vermilion, interspaces pearly. Tip of lower jaw black. Fins slightly reddish. Tip of first dorsal somewhat dusky.

Eight examples. Saboon Island, Ragay Bay, Ragay Gulf, Luzon. March 10, 1909. Length 26 to 30 mm. (1293). Back olivaceous, sides gray. Lower head and breast white, latter with reddish wash. Stripes on sides dusky orange, brightest on head; first begins behind snout, passes above eye, follows under lateral line to caudal base and joined by third stripe below, which begins behind upper part of orbit and runs into first below front of second dorsal; pair of short stripes on nuchal region, above first, become single across forehead; pair of broad stripes, third and fourth in order, behind eye to caudal; upper even with middle of eye and continuing forward as blackish stripe across maxillary to mandible tip; branch from last carried in front of eye, through front nostril, there joined behind pectoral base, by six or eight short bars of similar color; reddish stripe behind ventral base, follows along below anal, joins its fellow and continues along lower caudal edge. First dorsal olivaceous, black spot at tip of soft membranes, base of second and all of third reddish; second dorsal pink, more or less distinct reddish bar at base. Anal similar. Caudal reddish. Paired fins reddish, ventrals tipped with black.

14754. San Januico Straits, Leyte. April 13, 1908. Length 40 mm.

20627. Sirinao Island, Nakoda Bay, Palawan. December 30, 1908. Length 45 mm.

Forty-nine examples. Tara Island. December 15, 1908. Length 44 to 69 mm.

Three examples. Tara Island. December 15, 1908. Length 24 or 25 mm. (810).

23621. Tataan Island. February 20, 1908. Length 40 mm. (242). Stripe along back amber yellow, contains line of purple spots from head to caudal and thin silvery line which merges into broad band of silvery, which extends from eye to caudal base. Below broad amber yellow band from snout to caudal base. In thin band row of circular silvery spots, 9 from opercle to post-anal and then continued as a solid line to caudal base. Below yellow band another of silvery and median line of belly yellow. Under side of head and throat white. Entire body and head golden orange. Lips blackish. Iris black and gold. Side of jaws silvery. Purple line of back continued to snout. Dorsals orange, membranes crimson, spinous dorsal with crimson line at base, remainder pale yellow. Anal with crimson basal line, rest pink. Caudal and pectoral hyaline. Ventral crimson.

Twenty examples. Sandakan Bay, Borneo. March 2, 1908. Length 43 to 54 mm.

AMIA PARVULA Smith and Radcliffe

Amia parvula SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 432, pl. 34, fig. 2. Tataan Pass, Tawi Tawi Group and Saboon Island, Luzon.

Depth 3 to $3\frac{1}{3}$; head $2\frac{2}{5}$ to $2\frac{2}{3}$, width $2\frac{1}{10}$ to $2\frac{1}{2}$. Snout 4 to $4\frac{1}{5}$ in head from snout tip; eye 3 to $3\frac{2}{5}$, much greater than snout or interorbital; maxillary reaches $\frac{2}{5}$ to $\frac{1}{2}$ in eye, expansion 3 to $3\frac{1}{2}$ in eye, length $2\frac{1}{2}$ in head; teeth apparently uniserial, even, minute and only in jaws, none on vomer or palatines; interorbital $4\frac{1}{2}$ to $4\frac{3}{4}$, nearly level; preopercle ridge entire, edge finely serrated. Gill rakers 6 + 18, finely lanceolate, slender, nearly double gill filaments or $2\frac{1}{5}$ in eye.

Scales 22 in median lateral series to caudal base, 4 more on latter; tubes 6 in lateral line, which not extending beyond spinous dorsal; 9 scales transversely, 6 predorsal, 2 rows on cheek; head naked except cheeks and opercles. Scales with 9 to 11 basal marginal striae; 25 to 48 apical denticles, with or without 2 series transversely; circuli moderate.

D. VI-I, 9, 1, third spine $2\frac{2}{5}$ to $2\frac{1}{2}$ in total head length, first ray $1\frac{7}{8}$ to 2; A. II, 8, 1, second spine 3 to $3\frac{1}{8}$, first ray $1\frac{7}{8}$ to 2; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, deeply emarginate behind; least depth of caudal peduncle $3\frac{2}{5}$ to $3\frac{3}{4}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral 2 to $2\frac{1}{4}$.

Brown, paler to whitish on belly and under surface of head. Snout brown and mandible blackish terminally. Brown median line from occiput to spinous dorsal. Whitish triangular spot medianly in interorbital posteriorly and also close behind each side another white spot. Brown band, made up of dark brown dots, extends from above snout, over eye and back till below soft dorsal. Black band from side of snout, through eye and back medianly to caudal base. Another dark band from preorbital, along infraorbital backward broadly over cheek and opercle and obscure behind pectoral till over anal. Dark margin narrowly along front of spinous dorsal. Along bases of soft dorsal and anal each with blackish line; same fins also with dusky subbasal longitudinal band extending back to tip of last ray in each fin. Fins otherwise all pale.

Phillipinès, East Indies.

Two examples. Alibijaban Island, Ragay Gulf. March 6, 1909. Length 32 to 35 mm.

Twenty-nine examples. Busin Harbor, Burias Island. March 8, 1909. Length 25 to 30 mm.

One example. Canmahala Bay. March 11, 1909. Length 33 mm.

Two examples. Cataingan Bay, Masbate. April 18, 1908. Length 35 to 36 mm.

One example. Caxisigan Island, Balabac. January 2, 1909. Length 35 mm.

Four examples. Mantacao Island, west coast Bohol. April 8, 1908. Length 27 to 30 mm.

One example. Nabatas Point, Samar. July 24, 1909. Length 37 mm.

One example. Port Banalacan, Marinduque. February 23, 1909. Length 32 mm.

Four examples. Port Jamelo, Luzon. July 13, 1908. Length 28 or 29 mm.

Four examples. Rasa, Mantaguin Bay, Palawan Island. April 1, 1909. Length 33 to 34 mm.

Thirty-five examples. Saboon Island, Ragay Bay, Ragay Gulf, Luzon, March 10, 1909. Length 20 to 30 mm.

Eleven examples. Tataan Islands, Tawi Tawi Group. February 21, 1908. Length 34 to 39 mm. (274.) (Type No. 70244, U.S.N.M.) Body translucent, general color dusky above with median narrow black line. Axial line of opalescent green margined with blackish above, ending in a brilliant scarlet blotch larger than pupil at caudal base. Purplish stripe behind eye across opercle, bordered on either side by black. Chin and nose black. Top of head dusky with short silvery olive stripes. Lower head and breast white. First dorsal dusky, with first spine blackish. Second dorsal dusky, red brown bar across middle somewhat nearer base. Anal similar to soft dorsal with brown bar nearer base continued on lower edge of caudal peduncle. Caudal dusky. Paired fins slightly dusky. Iris dark.

One example. Tomahu Island. December 11, 1909. Length 32 mm.

AMIA AMBOINENSIS (Bleeker)

Apogon amboinensis BLEEKER, Nat. Tijds. Nederland. Indië, vol. 5, 1853, p. 329. Amboina.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 234 (copied).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 19 (Zanzibar).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Singapore; Kobe).—BEAUFORT, Bijl. Dierk., Amsterdam, 1913, p. 115 (Wauai waigé River, Waigui).

Amia amboinensis BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 90 (Singapore, Biliton, Bawean, Bouro, Amboina, Goram); vol. 8, 1876-77, pl. (68) 346, fig. 1.—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 158 (compiled).

Depth $2\frac{3}{5}$ to 3; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{2}$ to $2\frac{1}{10}$. Snout 4 to $4\frac{1}{8}$ in head; eye 3 to $3\frac{3}{8}$, greater than snout or interorbital; maxillary reaches $\frac{1}{2}$ to $\frac{3}{5}$ in eye, expansion 2 to $2\frac{1}{8}$, length $2\frac{1}{8}$ to $2\frac{1}{4}$ in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital 5 to $5\frac{1}{8}$, nearly level; preopercle ridge entire, edge finely and feebly serrated. Gill rakers 6+16, lanceolate, little longer than gill filaments or half of eye.

Scales 22 to 24 in lateral line to caudal base and 2 to 4 more on latter; 3 above, 6 below, 6 predorsal, 2 rows on cheek; head naked, except cheeks and opercles. Lateral line of tubes well exposed, simple, slender, and each with small basal scale. Scales with 8 to 10 basal radiating striae; 16 to 53 apical denticles, with 3 or 4 transverse series of basal elements; circuli moderate.

D. VI-I, 9, 1, third spine $1\frac{7}{8}$ to 2 in total head length, first ray $1\frac{3}{4}$ to $1\frac{4}{5}$; A. II, 8, 1, second spine $2\frac{1}{3}$ to $2\frac{2}{3}$, first ray $2\frac{1}{8}$ to $2\frac{5}{8}$; caudal $1\frac{1}{8}$ to $1\frac{1}{4}$, deeply emarginate behind; least depth of caudal peduncle $2\frac{3}{4}$ to 3; pectoral $1\frac{1}{2}$ to $1\frac{2}{3}$; ventral $1\frac{7}{8}$ to 2.

Pale brown above, inclining to whitish below, with silvery white reflections on side of head and trunk. Iris white, except as crossed

by dark band from snout tip to eye and back along median body axis to caudal base. At last medially rounded black spot size of pupil. Second dark line, narrower, extends from suprascapula along lateral line and ending below soft dorsal. Besides dark postocular band two dusky bars radiate from lower hind eye edge down over cheek. Head also more or less sprinkled with dark brown dots or specks. Body along each dorsal fin base with narrow dusky line. An underlaid dull brown line along lower side of tail longitudinally. Another from base of last dorsal spine back to base of last dorsal ray. Fins all pale to whitish, front edge of spinous dorsal dusky and soft dorsal and anal each with brown longitudinal band, that of soft dorsal further from base of fin.

Zanzibar, East Indies, Philippines. Recorded from Japan by Károlí.

Two examples. Nonucan River, Camp Overton, Mindanao. August 6, 1909. Length 57 to 65 mm.

One example. River, brackish water, Port Dupon, Leyte. March 17, 1909. Length 37 mm.

AMIA LATERALE (Valenciennes)

Apogon lateralis VALENCIENNES, Nouv. Ann. Mus. Hist. Nat. Paris, vol. 1, 1832, p. 58. Vanicolo.—GUICHENOT, Mem. Soc. Hist. Nat. Cherbourg, ser. 2, vol. 2, 1866, p. 145 (Madagascar).

Amia lateralis JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 246, fig. 40 (Apia, Samoa).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 254 (Cuyo).—SNYDER, Proc. U. S. Nat. Mus., vol. 49, 1912, p. 497 (Okinawa, Rui Kui).

Apogon ceramensis BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 256. Wahai, Ceram.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 235 (copied).—DAY, Fishes of India, pt. 1, 1875, p. 65, pl. 17, fig. 6 (Nicobars).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Sarangoon, Singapore).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (Kordo, Mysore).—DAY, Fauna Brit. India, vol. 1, 1889, p. 501.—WEBER, Semon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 263 (Amboina).—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 416 (Ternate).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 228 (Kangeang Island; Bima Bay; Kupang, Timor).—BEAUFORT, Bijdr. Dierk., Amsterdam, 1913, p. 114 (Batu mera mouth, Amboina; Majalibit Bay, Waigiu).

Amia ceramensis BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1875-76, p. 91 (Sumatra, Singapore, Bawean, Buru, Ceram, Amboina); vol. 8, 1876-77, pl. (58)336, fig. 1.—SEALE, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 274 (Sandakan, Borneo).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 159 (Moen, Suva, Arhno, Truk).

Depth $2\frac{3}{5}$ to $3\frac{1}{8}$; head $2\frac{1}{3}$ to $2\frac{1}{2}$, width $2\frac{1}{5}$ to $2\frac{1}{4}$. Snout $3\frac{7}{8}$ to 4 in head from snout tip; eye 3 to $3\frac{1}{3}$, greater than snout or interorbital; maxillary reaches $\frac{2}{3}$ to $\frac{3}{4}$ in eye or about opposite hind pupil edge, expansion 2 to $2\frac{2}{3}$ in eye, length 2 to $2\frac{1}{8}$ in head; bands of minute villiform teeth in jaws, on vomer and palatines; interorbital $4\frac{7}{8}$ to 5, nearly level or only slightly convex; preopercle ridge

entire, edge finely serrate with serrae little coarser below; preorbital entire. Gill rakers $5 + 16$, lanceolate, little longer than gill filaments or $2\frac{1}{5}$ in eye.

Scales 22 or 23 in lateral line to caudal base and 4 or 5 more on latter: 2 above, 6 below, 5 or 6 predorsal, 2 rows on cheek. Tubes in lateral line large, well exposed, each with a small narrow basal scale. Scales with 11 to 13 basal radiating striae; 61 to 81 apical denticles, with 1 to 3 transverse series of basal elements; circuli moderately fine.

D. VI-I, 9, 1, third spine 2 to $2\frac{1}{5}$ in total head length, first branched ray $1\frac{2}{3}$ to 2; A. II, 8, 1, second spine $2\frac{2}{5}$ to $3\frac{1}{2}$, first branched ray 2 to $2\frac{1}{8}$; caudal $1\frac{1}{8}$ to $1\frac{1}{2}$, slightly emarginate behind; least depth of caudal peduncle $2\frac{2}{5}$ to $3\frac{1}{4}$; pectoral $1\frac{2}{5}$ to $1\frac{3}{5}$; ventral $1\frac{4}{5}$ to $1\frac{5}{8}$.

General color pale brown, slightly paler on under surface of head and abdomen. Sides of head and body with silvery reflections, in some lights lavender to violet. Iris whitish to pale yellowish or deep neutral gray. Usually a deep brown line on middle of side from head nearly to caudal base, parallel with vertebral axis. At caudal base small blackish brown medial spot, greatly less than pupil and separated from dark lateral line. Fins all more or less whitish. Spinous dorsal dusky black over first three membranes terminally. Soft dorsal slightly grayish terminally, end of first membrane behind dorsal spine dusky or dark and about basal third of fin deep brown narrow longitudinal line. Anal paler but with similar dark brown subbasal line. Upper and lower caudal edges narrowly dusky. Many of our examples show a dark rounded spot, little smaller than pupil, above dark median lateral line at shoulder just below tubular lateral line.

Madagascar, Nicobars, East Indies, Philippines, Riu Kiu, Micronesia, Polynesia. This species bears a marked resemblance to *Amia hyalosoma*. Both appear to be common to brackish water, in the mouths of rivers, estuaries, etc. The black lateral band of *Amia lateralis* is replaced in *A. hyalosoma* by a more or less indistinct silvery one and the caudal spot of the latter is larger and the fish is more angular.

23203, 23204, 24084. Alimango River, Burias Island. March 5, 1909. Length 50 to 60 mm. 7 examples.

Twenty-eight examples. Batan Island. July 22, 1909. Length 30 to 57 mm. One example. Bato River, Lagonoy Gulf, Luzon. June 17, 1909. Length 54 mm.

19639. Bulan Island, South of Zamboanga. September 13, 1909. Length 54 mm. Ten examples. Cabugo Bay, Cantanduanes Island, east coast Luzon. June 9, 1909. Length 26 to 46 mm.

19376. Caiholo River, Ulugan Bay, Palawan. December 29, 1908. Length 29 to 43 mm. 4 examples.

Five examples. Canmahala Bay, small stream, Ragay Gulf, Luzon. March 11, 1909. Length 59 to 70 mm. Male with buccal ova.

- Two examples. Capunuyugan Point, east coast Mindanao. May 9, 1909. Length 59 to 60 mm.
- 24023 to 24026. Cebu docks. September 5, 1909. Length 69 to 74 mm.
- One example. Cebu market. August 28, 1909. Length 64 mm. [1823.]
- One example. Cebu market. September 3, 1909. Length 27 mm.
24075. Endeavor Strait, Malampaya Sound, Palawan Island. December 23, 1908. Length 63 mm.
6557. Head of Baheli River, Ulugan Bay, Palawan. December 28, 1908. Length 65 mm.
- Ten examples. Jolo, shore seine. March 6, 1908. Length 25 to 31 mm.
- One example. Mactan reef, tidepool. August 31, 1909. Length 44 mm.
- 23164, 23165. Malampaya River, Palawan Island. December 26, 1908. Length 73 to 87 mm. 13 examples.
- One hundred twenty-five examples. Malcochin Harbor, Linapacan Island, Linapacan Strait. December 19, 1908. Length 28 to 60 mm.
23713. Malinos River, Dumaran Island, vicinity eastern Palawan. April 7, 1909. Length 70 mm.
- 23750, 23754. Mantaquin Bay, Palawan Island. April 2, 1909. Length 73 to 77 mm.
23371. Murcielagos Bay, brackish water, Mindanao. August 20, 1909. Length 67 mm.
- Nine examples. Nabatas Point, Samar Island. July 24, 1909. Length 26 to 63 mm.
- Nineteen examples. Nakoda Bay, Palawan Island. December 31, 1908. Length 58 to 71 mm.
- Four examples. Nasipit, Mindanao. August 1, 1909. Length 58 to 62 mm.
- One example. Paluan River, Mindoro. December 11, 1908. Length 80 mm.
- Two examples. Pandanon Island, between Cebu and Bohol. March 23, 1909. Length 25 to 53 mm.
- 19454, 19455, 21623. Pasacao River, Ragay Gulf, Luzon. March 9, 1909. Length 70 to 82 mm. (275).
- Twenty-two examples. Port San Vicente, northern Luzon. November 18, 1908. Length 46 to 58 mm.
- One example. Pucot River, Marinduque Island. January 29, 1909. Length 70 mm.
- Five examples. Reef opposite Cebu. April 7, 1908. Length 22 to 64 mm.
23766. River at Pasacao, Ragay Gulf, Luzon. March 9, 1909. Length 52 to 75 mm. 2 examples.
- Fifty-eight examples. San Pascual, Burias Island. March 8, 1909. Length 25 to 60 mm. Males with buccal eggs.
- Two examples. Santiago Port, Pagapas Bay, Luzon. February 20, 1909. Length 51 mm.
- Ten examples. Ulugan Bay, near mouth of Baheli River, Palawan. December 28, 1908. Length 35 to 50 mm.
- Nine examples. Varadero Bay, Mindoro. July 24, 1908. Length 56 to 69 mm.
19997. West coast Palau Island, small river, off northern Luzon. November 18, 1908. Length 58 mm.
- 23124, 23129 to 23133. Sandakan Bay, Borneo. March 2, 1908. Length 46 to 83 mm. 47 examples.

AMIA FLEURIEU (Lacépède)

- Ostorhinchus fleurieu* (LACÉPÈDE), Hist. Nat. Poiss., vol. 4, 1803, pp. 23, 24; vol. 3, 1802, pl. 32, fig. 2. Great Equatorial Ocean (Indo-Pacific).—OGILBY, Mem. Queensland Mus., vol. 5, 1916, p. 182 (Darnley Island).
Amia fleurieu FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines);

- Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 274 (Philippines); Mem. Bishop Mus., vol. 10, 1928, p. 159 (compiled).
- Dipterodon hexacanthus* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1803, pp. 166, 168; vol. 3, 1802, pl. 30, fig. 2. Great Equatorial Ocean.
- Centropomus aureus* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1803, pp. 253, 273. Mauritius and Reunion.
- Amia aurea* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 92, pl. (59) 337, fig. 1 (Celebes, Flores, Solor, Batjan, Buru, Amboina, Waigiu, Rawak).
- Apogon aureus* MACLEAY, Proc. Linn. Soc. New South Wales, vol. 7, 1883, p. 236 (Port Moresby, New Guinea).—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 416 (Ternate).—BORSIERI, Ann. Mus. Civ. Stor. Nat. Genova, vol. 41, 1904, p. 190 (Massaua, Red sea).—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 13, 1907, p. 204 (Tulear Bay, Madagascar).—BEAUFORT, Bijdr. Dierk., Amsterdam, 1913, p. 114 (Saonek, Waigiu).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 228 (West Ceram, Saleyer, and Banda).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 521 (Natal coast, Mozambique).
- Apogon (Amia) aureus* KLUNZINGER, Fische Roth. Meer., 1884, p. 22 (Koseir).
- Apogon annularis* RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 48. Tor, Red Sea; Neue Wirbelth., Fische, 1835, p. 85.—QUOY and GAIMARD, Voy. Astrolabe, Zool., 1834, p. 649, pl. 1, fig. 5 (Amboina).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 239 (Amboyna and Hong Kong).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 20 (Zanzibar).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 713 (Koseir, Red Sea).—KOSSMANN and RÄUBER, Wiss. Ergebn. Reise Küstengeb. Roth. Meers, 1877, p. 8 (Red Sea).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (Cebu).—BOULENGER, Proc. Zool. Soc. London, 1887, p. 655 (Muscat).—ELERA, Cat. Fauna Filip., 1895, p. 470 (Cebu).—ZUGMAYER, Abh. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 10 (Oman).—REGAN, Ann. Durban Mus., vol. 1, 1914-17, p. 168 (Durban).—GILCHRIST and THOMPSON, Ann. Durban Mus., vol. 1, 1917, p. 340 (compiled).
- Apogon roseipinnis* CUVIER, Hist. Nat. Poiss., vol. 3, 1829, p. 490. Trinque-male, Ceylon.—PETERS, Arch. Naturg., 1855, p. 234 (Inhambane, Mozambique).
- Apogon annularis* var. *roseipinnis* GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 239.

Depth $2\frac{2}{5}$ to $2\frac{4}{5}$; head $2\frac{1}{3}$ to $2\frac{3}{5}$, width 2 to $2\frac{1}{4}$. Snout $4\frac{1}{2}$ to $5\frac{1}{4}$ in head from snout tip; eye $2\frac{1}{2}$ to 3, greater than snout or interorbital; maxillary reaches $\frac{3}{5}$ to $\frac{2}{3}$ in eye, expansion $2\frac{2}{5}$ to $2\frac{1}{2}$ in eye, length $1\frac{7}{8}$ to 2; teeth minute, villiform, in bands in jaws, on vomer and palatines, very short band on latter; interorbital $4\frac{1}{8}$ to $4\frac{1}{4}$, nearly level; preopercle with ridge entire, edge with minute and rather sparse denticles. Gill rakers 5 + 16, lanceolate, also 2 small rudiments above, equal gill filaments which $2\frac{1}{5}$ in eye.

Scales 23 or 24 in lateral line to caudal base and 4 or 5 more on latter; 2 or 3 above, 7 below, 4 predorsal, 2 or 3 rows of scales on cheek to preopercle ridge. Lateral line with tubes large, well exposed, each with small crenulate basal scale. Muzzle, including interorbital,

maxillary and suborbitals naked. Scales with 7 to 18 basal radiating striae; 44 to 128 apical denticles, with 1 to 6 transverse series of basal elements; circuli moderate.

D. VII-I, 9, 1, third spine 2 to $2\frac{1}{8}$ in total head length, first ray $1\frac{2}{5}$ to $1\frac{3}{4}$; A. II, 8, 1, second spine $2\frac{2}{3}$ to $2\frac{3}{4}$, first ray $1\frac{3}{5}$ to $1\frac{2}{3}$; caudal $1\frac{1}{10}$ to $1\frac{1}{5}$, slightly emarginate behind, with rounded lobes; least depth of caudal peduncle $2\frac{2}{5}$ to 3; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{3}{5}$ to $1\frac{2}{3}$.

Back brown, below paler to whitish, with silvery to brassy tints on opercles, lower side of head and abdomen. Iris whitish or grayish. Broad dusky brown vertical band, four scales wide at caudal base, extends slightly along upper and lower basal edges of caudal. Fins all more or less pale, lower ones whitish. Anal with narrow inconspicuous subbasal longitudinal brown line. Spinous dorsal dusky gray. Ventral with front edge grayish.

Red Sea, Mozambique, Natal, Ceylon, India, East Indies, Philippines, China. Quite uniform in coloration and abundant.

We do not accept Barnard's contention,⁶ in which he says: "*Ostorhinchus fleurieu* Lacép. and *Dipterodon hexacanthus* Lacép. can not be included in the synonymy of this species, as the descriptions of the dentition are not those of an *Apogon* at all."

Both descriptions and figures are truly vague and crude, though seem to us unmistakably those of the present species. Of *Ostorhinchus fleurieu* Lacépède says the snout, comprising the two bony jaws is well produced, resembling those of the scaroids, diodons, ovoides, tetrodons, tortoises, same as the beak of the parrakeets. For *Dipterodon*, which includes *D. plumieri* and *D. notatus* besides the genotype *D. hexacanthus*, the loose diagnosis is inaccurate, as the dentition is said to have the incisors compressed, pointed, and equidistant. Both the figures of *Ostorhinchus fleurieu* and *Dipterodon hexacanthus* agree in the dark transverse band across the caudal peduncle at or near the caudal base. The large teeth shown in the figure of the latter we think an error in engraving.

13742, 13743. Batangas market, Batangas Bay, Verde Island Passage. June 6, 1908. Length 58 to 68 mm.

5593 to 5595, 7946, 7947. Batangas market. June 7, 1908. Length 102 to 127 mm.

(1119). Capulaan Bay, Pagbilao Island, vicinity Marinduque Island. February 24, 1909. Length 110 mm.

16649, 16651. Galera Bay, Mindoro Island. June 9, 1908. Length 57 to 98 mm. 3 examples.

9924. Inamucan Bay, Mindanao Island. August 8, 1909. Length 125 mm. (1805.) Orange wash anteriorly. Pale stripe through lower eye from snout and somewhat similar one parallel through upper eye. Black band at caudal base. Tips of vertical fins more or less scarlet.

⁶ Ann. South Afric. Mus., vol. 21, 1927, p. 521.

17333. Isabel, Basilan Island, south of Zamboanga. September 11, 1909. Length 114 mm.
- 1587 (D. 5136). Jolo Light, S. 37° E., 0.70 mile (6° 04' 20'' N., 120° 59' 20'' E.), vicinity Jolo. In 22 fathoms. February 14, 1908. Length 103 to 123 mm. Ten examples (130). Pale brownish red, below axial line bright bronzed becoming pale on belly. Brown stripe through eye, across opercle, bordered by pale gray lines with lower breaking across opercle in purplish spots. Tubes of lateral line brown. Black blotch on caudal peduncle at caudal base. Orange shades on lower gill membrane and breast. Chin dusky. Dusky stripe on maxillary, continued as spot on lower cheek. Gray borders on eye become silvery on some specimens; inner edge of iris bronze, otherwise color of stripes across eye. First dorsal colored like back, first membrane darker red and growing dusky terminally. Second dorsal color of back but more clearly red. Anal scarlet, with dusky line at base of membranes. Caudal pale vermilion. Pectoral hyaline pink. Ventral scarlet to orange, with narrow light edge at tip of first ray, spine dusky; dusky of spine continued as submarginal on first ray.
- Three examples (D. 5143). Jolo Light, S. 50° W., 3.40 miles (6° 05' 50'' N., 121° 02' 15'' E.), vicinity of Jolo. In 19 fathoms. February 15, 1908. Length 110 to 115 mm. Male with buccal ova.
- 8089, 18569. Malanipa Island, east of Zamboanga. September 8, 1909. Length 88 to 110 mm.
- 17468, 17469, 21969. Murcielagos Bay, Mindanao Island. August 9, 1909. Length 97 to 102 mm.
- One example. Philippines. Length 107 mm.
- 23984, 23985. Santa Cruz Island, Marinduque. April 24, 1908, Length 61 to 68 mm.
- 19955, 21573. Port Galera, Mindoro. October 27, 1909. Length 80 to 93 mm.
- 23320 to 23324. Simaluc Island, north of Tawi Tawi. September 22, 1909. Length 57 to 111 mm.
- 17975, 17976. Simaluc Sibi Sibi Island. September 23, 1909. Length 105 mm.
- 23407 to 23409. Singaan Island, between Jolo and Tawi Tawi. September 21, 1909. Length 80 to 100 mm.
- 4643, 20719. Tambul Sigambul, Tonquil Island, south of Zamboanga. September 14, 1909. Length 107 to 111 mm.
18909. Tulnalutan Island, east of Zamboanga. September 9, 1909. Length 89 mm.
8029. Tumindao Island, Sulu Archipelago, Tawi Tawi Group. February 26, 1908. Length 117 mm. (330). Dusky above, below lateral line cadmium with pearly reflections. Royal purple stripe from middle of nasals through upper part of iris, breaking into spots behind eye. Another stripe, similar, begins on premaxillary, crosses preorbital and lower iris, ending in three blotches behind eye; another stripe across middle of maxillary ending as blotch on front angle of preopercle. Iris color of adjacent region of head. Breast somewhat dusky, throat and tip of chin quite dark. Black bar about wide as eye across caudal peduncle at caudal base. First dorsal like color of back, membranes with yellowish wash, almost cadmium on first three. Second dorsal rays pink, membranes with lemon wash. Caudal pink, rays lemon with greenish shades. Anal like caudal, colors more pronounced, tip of second spinous membrane scarlet and pale bar across base resting on black line. Pectoral pink. Ventral orange red, dusky along front.
- 15867, 23956. Danawan and Si Amil Islands, vicinity of Darvel Bay, Borneo. September 26, 1909. Length 61 to 98 mm.

23319. Tomahu Island, Bouro Island. December 11, 1909. Length 97 mm.
 14483 to 14485. Tomahu Island. December 12, 1909. Length 45 to 106 mm.
 Seven examples.
 23577, 23578, 23617, 23618. Tifu Bay, Bouro Island. December 10, 1909.
 Length 73 to 107 mm.
 23401, 23402. Dodepo and Pasejogo Islands, Gulf of Tomini, Celebes. November
 16, 1909. Length 88 to 96 mm.
 23715, 23716. Labuan Blanda Island, Buton Strait. December 14, 1909.
 Length 49 to 63 mm.
 Four examples. Makasser Island, Buton Strait. December 16, 1909. Length
 31 to 34 mm.
 23451. Doworra Island, south of Patiente Strait. December 2, 1909. Length
 65 mm.
 12479, 12480, 13832, 13833, 23290, 23624 to 23626. Powati Harbor, Makyan
 Island, Molucca Passage. November 28, 1909. Length 97 to 120 mm.
 23307, 23308, 23410. Gane Road, Gillolo Island. December 1, 1909. Length
 98 to 106 mm.
 23537 to 23539. Tidore Island, south of Ternate. November 25, 1909. Length
 110 to 115 mm.

AMIA MELAS (Bleeker)

Apogon melas BLEEKER, Journ. Indian Arch., vol. 2, 1848, p. 635. Bima, Sumbawa.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 243 (copied).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 230 (Biaru Island and High Key).—BEAUFORT, Bijd. Dierk., Amsterdam, 1913, p. 115 (Majalibit Bay, Waigiu).

Amia melas BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 94 (Batu, Nias, Singapore, Celebes, Sumbawa, Ternate, Buru, Ceram, Amboina); vol. 8, 1876-77, pl. (70) 348, fig. 1.—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 159 (compiled).

Depth $2\frac{1}{3}$ to $2\frac{2}{5}$; head $2\frac{1}{3}$ to $2\frac{2}{3}$, width $2\frac{1}{8}$ to $2\frac{1}{3}$. Snout $3\frac{3}{4}$ to 4 in head from snout tip; eye $2\frac{7}{8}$ to $3\frac{2}{5}$, greater than eye to equal with age, likewise interorbital; maxillary reaches opposite eye center, expansion $1\frac{4}{5}$ to $2\frac{1}{2}$ in eye, length $2\frac{1}{5}$ to $2\frac{1}{4}$ in head; bands of villiform teeth in jaws, on vomer and palatines; interorbital $3\frac{2}{5}$ to 4, nearly level; preopercle ridge entire, edge finely denticulate. Gill rakers 6 + 14, of which 3 or 4 uppermost and lowermost rudimentary, others lanceolate, $2\frac{1}{3}$ in eye.

Scales 23 or 24 in lateral line to caudal base and 3 or 4 more on latter; 2 above, 5 or 6 below, 2 predorsal; 1 or 2 rows on cheek; muzzle, including maxillary, preorbital and interorbital naked. Tubes in lateral line large, well exposed, simple. Scales with 15 to 19 basal radiating striae; apical denticles 85 to 166, with 1 or 2 transverse series of basal elements; circuli fine and irregularly waved apically.

D. VII-I, 9, 1, third spine $1\frac{3}{4}$ to $1\frac{7}{8}$ in total head length, first branched ray $1\frac{1}{5}$ to $1\frac{1}{4}$; A. II, 8, 1, second spine $1\frac{7}{8}$ to $2\frac{1}{5}$, first branched ray $1\frac{1}{4}$ to $1\frac{1}{2}$; caudal $1\frac{1}{10}$ to $1\frac{1}{4}$, slightly emarginate behind with upper lobe usually little longer; least depth of caudal peduncle 2 to $2\frac{1}{5}$; pectoral $1\frac{1}{2}$ to $1\frac{3}{5}$; ventral $1\frac{2}{5}$ to $1\frac{1}{2}$.

Deep sooty brownish generally. Lateral line usually paler brown, or bounded each side with obscure deeper brownish band diffusely. Belly slightly paler than back, with brassy tinge, though more or less sooty. Iris more or less yellowish, sometimes bright straw yellow, again dusky. Usually some silvery, brassy or purplish tints on opercle. Head without any very sharply defined markings; usually diffuse dusky to blackish line obliquely from lower eye edge across cheek to preopercle angle. Vertical fins all more or less dusky to blackish, variably pale basally on soft dorsal and anal, each of which may have black basal ocellus though its border rather dark. Pectoral brown, blackish basally. Ventral neutral black, innermost or shorter rays often paler.

Reported only from the East Indies, and our specimens all from the Philippines. It is quite variable in color with preservation, possibly the greatly contrasted specimens accentuated by preservation. Often some specimens show pale blotches on the vertical fins.

One example. Cebu market. August 28, 1909. Length 100 mm. (1825).

23166. Cebu Market. September 5, 1909. Length 69 mm.

87 and 4070. Endeavor Strait, Palawan. December 23, 1908. Length 80 to 95 mm.

6958. Iloilo market. May 31, 1908. Length 110 mm.

23703, 23704. Jolo. March 6-7, 1908. Length 108 to 114 mm. (431, 432).

23247. Mantacao Island, west coast of Bohol. April 8, 1908. Length 110 mm.

11229. Mantaquin Bay, Palawan. April 2, 1909. Length 106 mm.

19869. Nabatas Point, Samar. July 24, 1909. Length 103 mm.

23222, 23223. Opol, Mindanao. August 4, 1909. Length 121 mm.

10652. Polloc, Mindanao. May 22, 1908. Length 103 mm.

23231. Port Ciego, Balabac Island. January 3, 1909. Length 102 mm.

16536. Port Matalvi, Luzon. November 22, 1909. Length 102 mm.

14605. Port Palapag. June 3, 1909. Length 106 mm.

21353. Quinalasag Island, Masamat Bay. June 12, 1909. Length 103 mm.

Three examples. Reef opposite Cebu. April 7, 1908. Length 18 to 65 mm.

(511). Slaty, lateral line slightly paler. Black blotch smaller than eye at second dorsal base and much smaller one at anal base. Pectoral pale yellowish.

Other fins body color.

One example. Simaluc, Bisibisi Island. September 23, 1909. Length 42 mm.

24004. Sitanki Reef. September 24, 1909. Length 82 mm.

14212. Taganak Island, Jolo Sea. January 7, 1909. Length 124 mm.

Four examples. Tataan, Simaluc Island. February 18, 1908. Length 24 to 35 mm.

23293. Tataan. February 19, 1908. Length 83 mm.

23235. Tataan. February 20, 1908. Length 24 mm. (166). Greenish brown, with underlaid opalescent pink on lower half. Chin and snout with greenish yellow shades. Iris dark. Fins slaty, with round black spot $\frac{3}{4}$ size of eye on soft dorsal base and similar spot size of pupil on anal. Pectoral dusky straw, pinkish at tip.

23895. Pendek Island, Buton Strait. December 15, 1909. Length 99 mm.

23850, 23851, 23921. Togian Bay, Togian Island, Gulf of Tomini, Celebes. November 19, 1909. Length 73 to 99 mm.

14341. Great Tobea Island, Buton Strait. December 14, 1909. Length 106 mm.

24101. Great Tobea Island. December 15, 1909. Length 70 mm.

AMIA MONOCHROA (Bleeker)

Apogon monochrous BLEEKER, Act. Soc. Sci. Ind. Néerland. (Manado), vol. 1, 1856, p. 34. Manado, Celebes.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 236 (Amboina, East Indies, Fiji).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 715 (Koscir, Red Sea).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (North Celebes and Cebu).—GORGOZA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 283 (Samar).—ELERA, Cat. Fauna Filip., 1895, p. 470 (Manila Bay and Cebu coast).—REGAN, Ann. Durban Mus., vol. 1, 1914-17, p. 168 (Durban, Natal).—GILCHRIST and THOMPSON, Ann. Durban Mus., vol. 1, 1917, p. 340 (compiled).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 517 (Natal coast).

Amia monochroa EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 72 (Bulan).

Amia fusca (not QUOY and GAIMARD) FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 159 (part).

Depth $2\frac{3}{4}$ to $2\frac{1}{2}$; head $2\frac{1}{2}$ to $2\frac{2}{3}$, width 2 to $2\frac{1}{10}$. Snout $4\frac{1}{4}$ to $4\frac{1}{2}$ in head from snout tip; eye $2\frac{1}{2}$ to 3, greater than snout or interorbital; maxillary reaches $\frac{1}{2}$ to $\frac{3}{5}$ in eye, expansion $2\frac{2}{5}$ to $2\frac{3}{4}$, length 2 to $2\frac{1}{8}$ in head; teeth villiform, in bands in jaws and on vomer, none on palatines; interorbital $4\frac{1}{3}$ to $4\frac{2}{3}$, very slightly convex or nearly level; preopercle ridge entire, edge finely serrated. Gill rakers 7 + 20, finely lanceolate, longer than gill filaments or $\frac{1}{2}$ of eye.

Scales 23 or 24 in lateral line to caudal base and 3 or 4 more on latter; 2 above, 6 below, 3 or 4 predorsal, 2 rows on cheek; head naked, except cheeks and opercles. Tubes in lateral line simple, large, well exposed, each with small exposed basal scale. Scales with 10 to 12 basal radiating striae; 96 to 100 apical denticles with 3 transverse series of basal elements; circuli fine.

D. VII-I, 9, 1, fourth spine 2 to $2\frac{1}{10}$ in total head length, first ray $1\frac{2}{3}$ to $1\frac{3}{4}$; A. II, 8, 1, second spine 3 to $3\frac{1}{5}$, first ray $1\frac{1}{8}$ to 2; caudal $1\frac{1}{4}$ to $1\frac{2}{5}$, hind edge emarginate; least depth of caudal peduncle $2\frac{1}{3}$ to $2\frac{1}{2}$; pectoral $1\frac{1}{2}$ to $1\frac{3}{5}$; ventral $1\frac{3}{5}$ to $1\frac{3}{4}$.

Pale brown generally, under surface whitish. Iris brown. First dorsal with dull brown dusting, other fins whitish.

Red Sea, Natal, East Indies, Philippines, Polynesia.

Our specimens appear to be the same as those described by Bleeker. He makes no mention of the spot at the base of the posterior rays of the second dorsal or traces of stripes on the back and opercle.

Three examples. Batangas market. June 7, 1908. Length 57 to 81 mm.

Four examples. Jolo. February 14, 1908. Length 84 to 98 mm. (D. 5136.)

Two examples. Jolo. March 5, 1908. Length 64 to 77 mm. (D. 5174.) 23702. Jolo. March 6-7, 1908. Length 70 mm.

Three examples. Mansalay, Mindoro. June 4, 1908. Length 61 to 68 mm.

1180. Pagbilao Island, Capulaan Bay. February 24, 1909. Length 45 to 50 mm.

2035, 2036. Sulade Island, Sulu Archipelago. February 16, 1908. Length 70 to 72 mm. (D. 5147).

16628 to 16633. Sulade Island. February 16, 1908. Length 68 to 81 mm. (D. 5146).

AMIA HYPSELONOTA (Bleeker)

Apogon hypselonotus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 8, 1855, p. 309. Batu Archipelago.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 232 (copied); Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 20 (South Pacific).

Amia hypselonotus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 94, pl. (75)353, fig. 4 (Batu, Nias, Banka, Java, Bali, Celebes, Timor, Ternate, Ceram, Goram, Amboina, Aru).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 274 (Philippines); Mem. Bishop Mus., vol. 10, 1928, p. 160 (Wake Island, Mangareva).

Apogon leptacanthus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 12, 1856-57, p. 204. Ternate.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 232 (copied).

Amia leptacantha BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 97, pl. (71) 349, fig. 3 (Ternate).—FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines).

Apogon graeffii GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 22, pl. 20, fig. E. Boston Island, Marshall Group, Oceania.

Apogon graeffi STREETS, Bull. U. S. Nat. Mus., No. 7, 1877, p. 101 (Samoa).

Mionorus graeffei JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 247, fig. 41. Apia and Pago Pago, Samoa.

Amia gilberti JORDAN and SEALE, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 777, fig. 3. Negros.

Amia doryssa JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 245, fig. 39. Apia, Samoa.

Depth $2\frac{1}{8}$ to $2\frac{1}{4}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{2}{5}$ to $2\frac{1}{2}$. Snout $4\frac{1}{2}$ to 5 in head from upper jaw tip; eye $2\frac{2}{5}$ to $2\frac{3}{5}$, greater than snout or interorbital; maxillary reaches $\frac{1}{3}$ to $\frac{2}{5}$ in eye, expansion 2 to $2\frac{1}{2}$ in eye, length 2 to $2\frac{1}{8}$ in head; teeth very minute, villiform, in narrow bands in jaws and apparently absent from palate; interorbital $3\frac{4}{5}$ to 4, but slightly convex; ridge and hind edge of preopercle entire, lower edge denticulate. Gill rakers 6 + 23, finely lanceolate, twice length of gill filaments or $2\frac{1}{8}$ in eye.

Scales 22 or 23 in lateral line to caudal base and 2 or 3 more on latter; 2 above, 6 below, 5 predorsal, 2 rows of cheek scales to preopercle ridge; muzzle, including interorbital, maxillary and preorbital naked. Tubes in lateral line large, simple, well exposed, without basal scale to each. Scales with 5 to 10 basal radiating striae; largest scales with many as 28 to 30 small blunt apical denticles; circuli moderate.

D. VI-I, 9, 1 or 10, 1, second spine 2 to $2\frac{1}{2}$ in combined head and body to caudal base, first ray $1\frac{1}{4}$ to $1\frac{1}{3}$ in total head length; A. II, 9, 1, second spine $1\frac{2}{5}$ to $1\frac{3}{5}$, first ray $1\frac{3}{5}$ to $1\frac{3}{4}$; caudal $1\frac{1}{5}$ to $1\frac{1}{4}$, little emarginate behind; least depth of caudal peduncle $2\frac{1}{6}$ to $2\frac{1}{4}$; pectoral $1\frac{1}{3}$ to $1\frac{2}{5}$; ventral $1\frac{3}{5}$ to $1\frac{7}{8}$.

Light brown, sides of head and abdomen with silvery reflections, also some obsolete dusky dots on head, especially on cheek, others

about predorsal. Iris whitish or silvery, turns gray or slate in preservative. Fins all pale or whitish, with dusky tinge terminally on spinous dorsal.

East Indies, Philippines, Micronesia, Polynesia. A very abundant species, small and quite uniform in its general coloration. Changes with age slight. The elongated, filamentous, anterior or second dorsal spine variably long, perhaps sexual.

Jordan and Seale have attempted to establish the genus *Mionorus*. Krefft largely with reference to this species. Their statement "the palatines provided with teeth, and the two limbs of the preopercle both strictly entire" for generic characters do not agree, though variable in form and coloration intergrading forms frequent. Apparently the males are more slender than the females and usually without the filamentous dorsal spines. Most females have long dorsal spines and are without the black basal caudal spot.

19127. Beach at village near Chase Head, Endeavor Strait, Palawan Island.

August 9, 1909. Length 28 to 46 mm. 13 examples.

6754. Beach at village near Chase Head. December 22, 1908. Length 30 mm. Six examples. Biri Channel, east coast Luzon. June 2, 1909. Length 41 to 49 mm.

Twenty-one examples. Bolalo Bay, Palawan Island. December 21, 1908. Length 26 to 47 mm. Male with buccal ova.

23712. Busin Harbor, Burias Island. March 8, 1909. Length 49 mm.

18512. Butaanan Island, east coast Luzon. June 13, 1909. Length 51 mm. (1307).

Nineteen examples. Canmahala Bay, Luzon. March 11, 1909. Length 33 to 51 mm.

23649. Caracaran, Batan Island. June 8, 1909. Length 45 to 50 mm. 2 examples.

Ten examples. Cataingan Bay, Masbate Island. April 19, 1908. Length 40 to 52 mm.

16103 to 16106. Cataingan Bay. May 14, 1909. Length 41 to 43 mm.

Twenty-two examples. Endeavor Strait, Palawan Island. December 22, 1908. Length 34 to 48 mm.

122, 123, 129, 24074. Endeavor Strait. December 23, 1908. Length 35 to 44 mm.

23300. Makesi Island, Palawan Island. April 5, 1909. Length 49 mm.

Three examples. Mantacao Island, west coast Bohol. April 8, 1908. Length 40 to 44 mm.

21970. Murcielagos Bay, Mindanao. August 9, 1909. Length 92 mm.

Two hundred forty-five examples. Near Palag Bay, Luzon. June 16, 1909. Length 28 to 48 mm.

Nine examples. Philippines. Length 41 to 53 mm.

One hundred eighteen examples. Port Jamelo, Luzon. July 13, 1908. Length 26 to 48 mm.

16538 to 16541. Port Matalvi, Luzon. November 22, 1908. Length 39 to 44 mm.

8429. Port Matalvi. November 23, 1908. Length 29 to 47 mm. 46 examples. One example. Port Palapag, east coast Luzon. June 2, 1909. Length 40 mm.

23262. Port Palapag. June 3, 1909. Length 50 mm.

Fifty-six examples. Port Uson, west of Pinas Island. December 17, 1908. Length 31 to 56 mm.

- Ten examples. Rapurapu Island. June 22, 1909. Length 42 to 50 mm.
- Fifty-four examples. Rasa Island, Mantaquin Bay, Palawan Island. April 11, 1909. Length 36 to 53 mm.
- Two examples. Romblon. March 25, 1908. Length 44 to 45 mm.
- Nine examples. Romblon. March 26, 1908. Length 33 to 51 mm. (472 to 474, 480, 482, 483). Translucent pearly, dusky above. Caudal peduncle black. Opercle with 3 opalescent blue spots, 2 behind opercle, 1 on middle of side and 1 on upper cheek. Dark stripe across preorbital to tip of mandible. Iris dusky silvery, with purple reflections. Breast more or less scarlet. Dorsal pearl color, with slight yellowish wash. Caudal lobes very narrowly tipped with black, rest of fin body color. Anal hyaline purplish, with rosy tint and bright yellow bar at base resting on black, dusky continued on lower edge of caudal peduncle. Vent black. Pectoral hyaline. Ventral pale scarlet. Other specimens paler, without black. On opercle and shoulder 4 or 5 narrow vertical cadmium yellow bars. Chin and front of head dusky. Greenish white and dusky line around dorsal and on top of caudal peduncle. Dorsal dusky orange. Pectoral slightly pink. Caudal and anal, also ventral, very pale vermilion.
- Thirty-three examples. Saboon Island, Ragay Gulf, Luzon. March 10, 1909. Length 30 to 50 mm.
- 8281 to 8291, 8304 to 8313, 17780. San Miguel Island, Tobacco Bay, east coast Luzon. June 4, 1909. Length 30 to 49 mm. 23 examples.
23905. Tataan, Tawi Tawi Group. February 21, 1908. Length 45 mm.
- Eighty-one examples. Tonquil Reef, south of Zamboanga. September 14, 1909. Length 34 to 50 mm.
- 6646, 6647, 23171, 23172, 23425. Tutu Bay, Jolo Island. September 19, 1909. Length 38 to 52 mm. (1963). 50 examples. Yellowish generally. Cadmium yellow duplicated stripes from eye obliquely across cheek. Another pair down opercle and 2 across side under spinous dorsal, with iridescent blue interval between each pair. Caudal peduncle dusky, continued along dorsal base. Dorsals somewhat dusky at tip, but of general yellowish color of back. Anal and ventrals pink.
- 23771 to 23773. Ulugan Bay, Palawan Island. December 28, 1908. Length 38 to 41 mm. 3 examples.
241. Ulugan Bay. December 29, 1908. Length 40 to 45 mm. 3 examples. (D. 5143). Jolo Light, S. 50° W., 3.40 miles (6° 05' 50" N., 121° 02' 15" E.), vicinity of Jolo. In 19 fathoms. February 15, 1908. Length 42 mm.

AMIA ATROGASTER Smith and Radcliffe

Amia atrogaster SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 439, pl. 35, fig. 3. West coast of Luzon (N. Lat. 16° 30' 36", E. Long. 120° 11' 6", in 45 fathoms).

Depth $3\frac{3}{5}$ to $3\frac{3}{4}$; head $2\frac{2}{5}$ to $2\frac{3}{5}$, width $2\frac{1}{4}$ to $2\frac{1}{2}$. Snout $4\frac{1}{3}$ to $4\frac{1}{2}$ in head from snout tip; eye $3\frac{2}{5}$ to $3\frac{1}{2}$, greater than snout or interorbital; maxillary reaches $\frac{2}{5}$ to $\frac{2}{3}$ in eye, expansion $2\frac{1}{3}$ to $2\frac{1}{2}$, length 2 to $2\frac{1}{2}$ in head from snout tip; teeth villiform, in bands in jaws, on vomer and apparently absent from palatines; interorbital $4\frac{1}{3}$ to $4\frac{4}{5}$, level; preopercle ridge and edge finely denticulate. Gill rakers 8 + 20, lanceolate, $2\frac{1}{2}$ in eye or little longer than gill filaments.

Scales (pockets) 24 in lateral series to caudal base and 3 or 4? more on latter; 8 or 9 transversely, about 4 predorsal; 2 rows on cheek;

head naked, except cheeks and opercles; as but few of the specimens have any scales we have omitted their structure.

D. VII-I, 9, 1, third spine $2\frac{2}{5}$ to $2\frac{4}{5}$ in total head length, first ray $1\frac{3}{4}$ to $2\frac{1}{8}$; A. II, 8, 1, second spine $2\frac{4}{5}$ to $3\frac{1}{8}$, first ray $2\frac{1}{5}$ to $2\frac{1}{3}$; caudal $1\frac{1}{2}$ to $1\frac{3}{4}$, emarginate behind; least depth of caudal peduncle $3\frac{1}{8}$ to $3\frac{1}{2}$; pectoral 2 to $2\frac{1}{8}$; ventral $2\frac{1}{8}$ to $5\frac{1}{5}$.

Pale drab brown or gray, below on head and abdomen whitish. Mandible tip dusky. Dark brown bar on side of snout well below nostril obliquely to eye, its width much less than pupil. Head above, cheeks and opercles, with obscure brown dots. Fins all pale or whitish, sprinkled with dusky dots on spinous dorsal. Iris white.

Named with reference to its black peritoneum. Specimens in alcohol fragile and tender. Only known from the types.

(D. 5442.) Eight examples. San Fernando Point Light, N. 39° E. 8.4 miles west coast of Luzon ($16^{\circ} 30' 36''$ N., $120^{\circ} 11' 06''$ E.). May 10, 1909. Length 46 to 59 mm. (Type No. 70249 U.S.N.M. and 7 paratypes.)

AMIA APOGONOIDES (Bleeker)

Cheilodipterus apogonoides BLEEKER, Act. Soc. Sci. Ind. Néerland. (Manado), vol. 1, 1856, p. 37. Manado, Celebes.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 249 (copied).

Chilodipterus apogonoides KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Singapore).

Amia apogonoides BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 97 (Celebes); vol. 8, 1876-77, pl. (63) 341, fig. 2.

Apogon apogonoides WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 230 (Banda).

Depth $2\frac{3}{4}$ to 3; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{4}$ to $2\frac{2}{5}$. Snout $4\frac{2}{5}$ to 5 in head from snout tip; eye 3 to $3\frac{1}{3}$, much greater than snout or interorbital; maxillary reaches $\frac{3}{5}$ to $\frac{2}{3}$ in eye, expansion 2 to $2\frac{1}{2}$ in eye, length 2 to $2\frac{1}{10}$ in head; teeth in villiform bands in jaws with inner row in each little enlarged, lower laterals especially so and curved, also pair of rather large teeth on vomer and row of little enlarged teeth on each palatine; interorbital 5 to $5\frac{1}{8}$, nearly level; preopercle ridge entire, edge minutely denticulate; preorbital entire. Gill rakers 5+12, lanceolate, greatly longer than gill filaments or $2\frac{2}{5}$ in eye.

Scales 24 in lateral line to caudal base and 4 more on latter; 2 above, 6 below, 5 or 6 predorsal, 2 rows on cheek. Tubes in lateral line large, simple, well exposed and each with basal partly crenulated scale. Scales with 7 to 11 basal radiating striae; 47 to 96 apical denticles, with 2 to 5 transverse series of basal elements; circuli moderately fine.

D. VII-I, 9, 1, fourth spine $2\frac{1}{5}$ to $2\frac{1}{2}$ in total head length, first branched ray $1\frac{2}{3}$ to $1\frac{4}{5}$; A. II, 8, 1, second spine 3 to $3\frac{1}{8}$, first branched ray $1\frac{4}{5}$ to $1\frac{7}{8}$; caudal $1\frac{1}{4}$ to $1\frac{1}{3}$, deeply emarginate

behind, lobes pointed; least depth of caudal peduncle $2\frac{3}{4}$ to $2\frac{4}{5}$; pectoral $1\frac{3}{5}$ to $1\frac{2}{3}$; ventral $1\frac{7}{8}$ to 2.

Brown on back and above generally, lower surface of head and abdomen paler to whitish with lilac or silvery reflections. Rather broad, ill defined deep brown band around end of snout to eye, also includes tip of muzzle. Fins all pale brownish, spinous dorsal blackish brown terminally. Iris pale yellowish white, with neutral gray above. Only known from the East Indies.

24009. Powati Harbor, Makyan Island. November 28, 1909. Length 60 mm. (2078). Translucent. Iris dusky red pearl color. Side of body gold and shot with yellow mark. Yellow stripe across snout through eye to opercle edge. Fins pale pink, first and second dorsal membranes black. Six examples. Powati Harbor. November 28, 1909. Length 60 to 96 mm. 23975. Limbe Strait, Celebes. November 11, 1909. Length 61 mm.

AMIA DIVERSA Smith and Radcliffe

Amia diversa SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 434, pl. 37, fig. 1. Canmahala Bay, Luzon.

Depth $2\frac{3}{4}$; head $2\frac{1}{2}$, width $2\frac{1}{2}$. Snout $4\frac{1}{2}$ in head from snout tip; eye 3, greater than snout or interorbital; maxillary reaches opposite eye center, expansion $2\frac{1}{2}$ in eye, length 2 in head from snout tip; teeth in villiform bands in jaws, on vomer and palatines; interorbital 4, nearly level; preopercle ridge and edge serrate, though serrae of ridge less perfect. Gill rakers 7 + 17, lanceolate, little longer than gill filaments or $2\frac{1}{3}$ in eye.

Scales 25 in lateral line to caudal base and 3 more on latter; 2 scales above, 6 below, 3 predorsal, 2 rows on cheek to preopercle ridge; caudal base scaly, other fins scaleless. Lateral line with large tubes, each with large crenulated basal scale. Scales with 14 basal radiating striae, edge scalloped; 74 to 76 apical denticles, short, with 2 transverse series; circuli very fine.

D. VII-I, 9, I, fourth spine $2\frac{1}{3}$ in total head length, first ray $1\frac{7}{8}$; A. II, 8, I, second spine $3\frac{1}{5}$, first ray 2; caudal $1\frac{1}{3}$, emarginate; least depth of caudal peduncle $2\frac{2}{5}$; pectoral $1\frac{3}{4}$; ventral 2.

Light brown, back little more brownish. Sides of head and trunk with brassy reflections. Dark brown bar from snout tip, includes chin, to eye, continued faintly on postocular; edged below by silvery marginal line, also silvery line above on eye. Upper membranes of front dorsal spines dusky. Soft dorsal with brown, narrow, subbasal line. Fins otherwise uniformly pale. Small round black spot at caudal base medially, less than pupil.

Known only from the type, a female with immature eggs.

70246, U.S.N.M. Canmahala Bay, Ragay Gulf, Luzon. Length 78 mm. Type.

AMIA NIGROCINCTA Smith and Radcliffe

Amia nigrocincta SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 435, pl. 37, fig. 2. Near Jolo (N. Lat. $6^{\circ} 5' 50''$, E. Long. $121^{\circ} 2' 15''$), in 19 fathoms.

Depth $2\frac{3}{4}$ to 3; head $2\frac{1}{2}$ to $2\frac{2}{3}$, width 3 to $3\frac{1}{8}$. Snout $4\frac{1}{8}$ to $4\frac{1}{4}$ in head from snout tip; eye $3\frac{1}{4}$ to $3\frac{1}{2}$, greater than snout or interorbital; maxillary reaches $\frac{3}{5}$ to $\frac{2}{3}$ in eye or about opposite hind pupil edge, expansion $1\frac{7}{8}$ to 2 in eye, length $1\frac{7}{8}$ to 2 in head; bands of villiform teeth in jaws, on vomer and palatines; preopercle ridge and edge finely serrate; preorbital entire. Gill rakers 6 + 16, lanceolate, longer than gill filaments or $1\frac{3}{4}$ in eye.

Scales 23 or 24 in lateral line to caudal base and 3 or 4 more on latter; 2 above, 6 below, 3 or 4 predorsal, 2 rows on cheek. Tubes in lateral line large, well exposed, each with small crenulated basal scale. Scales with 16 to 18 basal radiating striae; 73 to 118 apical denticles form an alternate series or with 2 or 3 transverse series of basal elements; circuli fine but none apical.

D. VII-I, 9, 1, fourth dorsal spine $2\frac{1}{3}$ to $2\frac{3}{5}$ in total head length, second dorsal ray $1\frac{4}{5}$ to $1\frac{7}{8}$; A. II, 8, 1, second spine $3\frac{3}{5}$ to 4, first branched ray 2 to $2\frac{1}{8}$; caudal $1\frac{1}{5}$ to $1\frac{1}{3}$, hind edge emarginate; least depth of caudal peduncle $2\frac{3}{4}$ to $2\frac{7}{8}$; pectoral $1\frac{2}{3}$ to $1\frac{3}{4}$; ventral $1\frac{7}{8}$ to $2\frac{1}{10}$.

Largely light brown, sides of head and trunk with dull silvery to brassy tints. Slightly diffuse pale streak follows along in lateral line and another parallel with vertebral axis laterally. Brown band, including end of mandible and snout extends to eye and faintly reflected on postocular. Small black median spot, less than pupil, at caudal base and sometimes reflected as diffuse dark bar above and below. Fins generally all pale, on spinous dorsal broad dusky band obliquely from front edge up till behind fifth spine, also subbasal deep brown line on soft dorsal and usually another along anal subbasally but most distinct posteriorly. Iris pale or brassy to brown or neutral gray.

Known only from the Philippines, we having the following series listed below. It is one of the paler and less contrasted forms though fairly constant in color pattern. Several males with the thorax swollen, also the mouth cavity, evidently having just completed buccal incubation. In the lot D. 5143 were also several gravid females, but only one male with a few eggs in the buccal cavity.

4397 (D. 5134). Balukbaluk Island, S. 59° W., 6.25 miles ($6^{\circ} 44' 45''$ N., $121^{\circ} 48' 48''$ E.), Sulu Archipelago near Basilan Island. In 25 fathoms. February 7, 1908. Length 80 mm.

Five examples (D. 5360). Corregidor Light, N. 74° W., 6.9 miles ($14^{\circ} 21' 12''$ N., $120^{\circ} 41' 41''$ E.), Manila Bay, Luzon. In 12 fathoms. February 7, 1909. Length 55 to 68 mm.

Thirty-five examples (D. 5143). Jolo Light, S. 50° W., 3.4 miles ($6^{\circ} 05' 50''$ N., $121^{\circ} 02' 15''$ E.), vicinity Jolo. In 19 fathoms. February 15, 1908. Length 68 to 92 mm. (Also type No. 70247, U.S.N.M.)

AMIA SEMILINEATA (Schlegel)

Apogon semilineatus SCHLEGEL, Fauna Japonica, Poiss., pt. 1, 1842, p. 4, pl. 2, fig. 3. Japan.—RICHARDSON, Ichth. China, Japan, 1846, p. 221 (copied).—BLEEKER, Verh. Batav. Genootsch., No. 4, vol. 26, 1854, p. 55, pl. 1, fig. 2 (Nagasaki).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 240 (copied).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Nagasaki and Kobe).—STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 47, 1883, p. 2 (Tokyo).—NYSTRÖM, Svensk. Vet. Akad. Handl., 1887, p. 8 (Nagasaki).—ISHIKAWA and MATSUURA, Prelim. Cat. Fishes Tokyo, 1897, p. 55.—JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 903, fig. 7 (Tokyo, Yokohama, Yodomi, Enoshima, Misaki, Wakanoura).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 527 (Japan).—JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 230 (Wakanoura and Misaki).

Amia semilineata SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 412 (Misaki and Shimizu).—JORDAN and THOMPSON, Mem. Carnegie Mus., vol. 6, No. 4, 1914, p. 247, fig. 19 (Shimonoseki and Osaka).

Amia semilineatus SEALE, Philippine Journ. Sci., vol. 9, 1914, p. 64 (Hong Kong).

Apogon quadrifasciatus (not CUVIER) JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 353. Yokohama (lapsus for *Apogon semilineatus*).

Depth $2\frac{3}{4}$ to $3\frac{1}{4}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{5}$ to $2\frac{1}{2}$. Snout 4 to $4\frac{4}{5}$ in head from snout tip; eye $3\frac{1}{3}$ to $3\frac{3}{5}$, subequal with snout or greater in young, always greater than interorbital; maxillary reaches $\frac{2}{5}$ to $\frac{3}{5}$ in eye, expansion 2, length 2 in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $4\frac{1}{3}$ to 5, nearly level; preopercle ridge entire and edge finely denticulate. Gill rakers 8 + 18, lanceolate, greatly longer than gill filaments or $2\frac{1}{2}$ in eye.

Scales 25 in lateral line to caudal base and 3 more on latter; 2 above, 6 below, 6 predorsal, 2 rows on cheek; head naked, except cheeks and opercles. Lateral line of rather large tubes, each well exposed and with crimped basal scale. Scales with 13 to 15 basal radiating striae; 73 to 90 apical denticles, with 3 to 5 transverse series of basal elements; circuli fine.

D. VII–I, 9, 1, fourth spine $2\frac{1}{3}$ to $2\frac{2}{5}$ in total head length, first ray $1\frac{2}{3}$ to $1\frac{3}{4}$; A. II, 8, 1, second spine $2\frac{3}{4}$ to 3, first ray $1\frac{3}{4}$ to $1\frac{1}{2}$; caudal $1\frac{1}{5}$ to $1\frac{1}{4}$, deeply emarginate behind; least depth of caudal peduncle $2\frac{7}{8}$ to $3\frac{1}{4}$; pectoral $1\frac{2}{5}$ to $1\frac{3}{5}$; ventral $1\frac{7}{8}$ to 2.

Rather pale brown, inclining to white below with silvery white reflections, especially about head and breast. Iris silvery white, with brown above. On snout from its tip dark brown band extends to eye, then back over postocular along median axis to caudal peduncle. Another dark brown band begins on snout above, and extends over eye back along upper side of back till below soft dorsal fin. Round blackish spot, little smaller than pupil, at caudal base medianly. Fins all pale to whitish, except blackish spot marginally at apex of spinous dorsal over at least 2 membranes.

Philippines, China, Japan.

(D. 5245), 1413 and 1414. Uanivan Island, S. 41° E., 4 miles ($6^{\circ} 52' 36''$ N., $126^{\circ} 14' 52''$ E.), vicinity Pujada Bay. May 15, 1908. Length 100 to 103 mm. 2 examples.

(D. 5442). San Fernando Point Light, N. 39° E., 8.4 miles ($16^{\circ} 30' 36''$ N., $120^{\circ} 11' 06''$ E.), west coast Luzon. May 11, 1909. Length 5264 mm. 2 examples.

AMIA NOTATA (Houttuyn)

Sparus notatus HOUTTUYN, Verh. Holland. Maatsch. Wet. Haarlem, vol. 20, pt. 2, 1782, p. 320. Japan.—GMELIN, Syst. Nat. Linn., vol. 1, 1789, p. 1272.—WALBAUM, Artedi Piscium, vol. 3, 1792, p. 303.—FORSTER, Fauna Indica, 1795, p. 303.

Apogon notatus JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 1904, fig. 8 (Nagasaki and Wakanoura).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 527 (Japan).

Amia notata JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 698, fig. 4 (Yakushima).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 412 (Kagoshima and Tanegashima).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 274 (Philippines).

Apogon kiushiuanus (DÖDERLEIN) STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 47, 1883, p. 2. Kagoshima.

Apogon spilurus REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, 1905, p. 321, pl. 3, fig. 5. Karachi.

Amia jenkinsi EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 73, fig. 9. Bulan.

Amia jenkinsi FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines).

Depth $2\frac{1}{8}$ to 3; head $2\frac{1}{3}$ to $2\frac{2}{5}$, width $2\frac{1}{4}$ to $2\frac{1}{3}$. Snout $4\frac{1}{8}$ to $4\frac{1}{5}$ in head from snout tip; eye 3 to $3\frac{2}{5}$, greater than snout or interorbital; maxillary reaches opposite eye center, expansion $2\frac{1}{4}$ to $2\frac{2}{5}$ in eye, length 2 to $2\frac{1}{8}$ in head; narrow bands of villiform teeth in jaws, on vomer and palatines; interorbital $4\frac{1}{8}$ to $4\frac{1}{2}$ in head, nearly level; preopercle ridge and edge finely denticulate; preorbital entire. Gill rakers 7 + 18, lanceolate, $2\frac{1}{2}$ in eye, much longer than gill filaments.

Scales 23 or 24 in lateral line to caudal base and 3 or 4 more on latter; 2 or 3 above, 5 or 6 below, 3 predorsal, 2 rows on cheek to preopercle ridge. Tubes in lateral line simple, rather large, with small crimped basal scale to each. Scales with 6 to 9 basal radiating striae; 65 to 87 apical denticles, with 2 to 4 transverse series of basal elements; circuli fine.

D. VII—I, 9, 1, fourth spine $2\frac{1}{2}$ to $2\frac{3}{5}$ in total head length, first ray $1\frac{7}{8}$ to 2; A. II, 8, 1, second spine 4 to $4\frac{1}{5}$, first ray $2\frac{1}{8}$ to $2\frac{1}{5}$; caudal $1\frac{1}{3}$ to $1\frac{2}{5}$, moderately emarginate behind; least depth of caudal peduncle 3; pectoral $1\frac{7}{8}$ to 2; ventral 2 to $2\frac{1}{6}$.

Back and upper surface brown, sides and below paler and with slight silvered tinge. Iris whitish, with slight brownish tinge above. Dusky brown bar from mandible tip along side of snout to eye.

Small dusky brown spot, much less than pupil, each side of occiput. Round blackish blotch medianly at caudal base, large as pupil. Fins all pale to whitish, front margin of spinous dorsal and base of soft dorsal with blackish band.

Karachi, Philippines, Japan.

Six examples. Cannahala Bay, Luzon. March 11, 1909. Length 50 to 60 mm. 8498 to 8538. Catbalogan, Samar. April 16, 1908. Length 78 to 85 mm.

Twenty-six examples. Cataingan Bay, Masbate Island. April 18, 1908. Length 25 to 35 mm.

1589 (D. 5136). Jolo Light, S. 37° E., 0.70 mile ($6^{\circ} 04' 20''$ N., $120^{\circ} 59' 20''$ E.), vicinity of Jolo. In 22 fathoms. February 14, 1908. Length 82 to 90 mm. 5 examples.

18177, 18178. Port San Pio Quinto, Camiguin Island, China Sea, vicinity Batanes. November 11, 1908. Length 64 to 67 mm.

Six examples. U.S.N.M. Acc. No. 100,455. Length 34 to 63 mm.

AMIA GRIFFINI Seale

Amia griffini SEALE, Philippine Journ. Sci., vol. 5, No. 2, 1910, p. 117, pl. 2, fig. 2. Bantayan Island, Philippines.

Depth $2\frac{1}{3}$ to $2\frac{2}{5}$; head $2\frac{2}{3}$ to $2\frac{3}{4}$, width $1\frac{1}{5}$ to 2. Snout $3\frac{7}{8}$ to $4\frac{1}{5}$ in head from snout tip; eye $2\frac{7}{8}$ to 3, greater than eye or inter-orbital; maxillary reaches $\frac{3}{5}$ to $\frac{2}{3}$ in eye, expansion $2\frac{1}{3}$ to $2\frac{2}{5}$ in eye, length 2 to $2\frac{1}{10}$ in head; teeth in villiform bands in jaws, on vomer and palatines; interorbital 4 to $4\frac{1}{4}$, nearly level; preopercle ridge entire in young, finely serrate with age, also preopercle edge always serrate; preorbital and edge of orbital socket always entire. Gill rakers 6 + 16, lanceolate, much longer than gill filaments or $2\frac{1}{4}$ in eye.

Scales 23 or 24 in lateral line to caudal base and 6 or 7 more on latter; 2 or 3 above, 6 or 7 below, 3 or 4 predorsal, 2 or 3 rows on cheek. Tubes in lateral line large, simple, each well exposed and with small basal crenulated scale. Scales with 21 to 25 basal parallel to subradiating striae; 179 to 230 apical denticles, with 3 or 4 transverse series of basal elements; circuli fine, none apical.

D. VII-I, 9, 1, third spine $1\frac{2}{3}$ in total head length, second branched dorsal ray long as head in male or $1\frac{1}{5}$ to $1\frac{2}{5}$ in female; A. II, 8, 1, second spine $2\frac{3}{4}$ to 3, first branched ray $1\frac{1}{2}$ to $1\frac{3}{4}$; caudal equals head, little emarginate behind, upper lobe usually longer, both lobes more or less rounded; least depth of caudal peduncle $1\frac{7}{8}$ to $2\frac{1}{10}$; pectoral $1\frac{1}{3}$ to $1\frac{2}{5}$; ventral $1\frac{1}{4}$ to $1\frac{1}{3}$.

Brown generally, scarcely paler below. Each scale with basal deeper brown bar so arranged to form reticulate pattern. Abdomen, opercles and sides of abdominal cavity with brassy to coppery tints. At caudal base medially small round dusky brown blotch about half size of pupil, usually conspicuous. Fins variably pale brown, sometimes clouded deeper brown or even dusky brown. Some males with

lower surface of head and ventrals quite swarthy. Iris pale yellowish, to neutral gray, brown or slaty.

Known previously only from Seale's description of the type and 2 paratypes, which he calls cotypes. It was described, and figured though without any comment as to its relationship. It is, however, somewhat variable, especially the sexes. The males show the second dorsal ray greatly elongated, when depressed extending beyond caudal base.

Known only from the Philippines.

23706 to 23709. Beach at village near Chase Head, Endeavor Strait, Malampaya Sound, Palawan Island. December 22, 1909. Length 104 to 114 mm. (969, 970). Olive above. Top of head with yellow shades, washed with red below. First dorsal body color, second to fourth membranes orange terminally and second tipped with black. Second dorsal body color, merging into reddish terminally, produced ray distinctly red. Caudal with reddish shades, most distinct on edges of lobes. Fins otherwise dusky red. Male with eggs.

16598. Beacon Reef, Catbalogan, Samar Island. April 16, 1908. Length 114 mm.

16671. Busin Harbor, Burias Island. April 23, 1908. Length 142 mm.

8268, 8269, 8591. Catbalogan, Samar Island. April 14, 1908. Length 116 to 125 mm. Male with buccal eggs.

23192, 23193. Catbalogan, Samar Island. April 15, 1908. Length 113 to 120 mm.

Twenty examples. Catbalogan. April 16, 1908. Length 100 to 125 mm.

5810. Nabatas Point, Samar Island. July 24, 1909. Length 127 mm.

18636 (1290). Saboon Island, Ragay Gulf, Luzon. March 10, 1909. Length 132 mm.

14750 to 14751. San Januico Strait, between Leyte and Samar. April 13, 1908. Length 107 to 117 mm. Male with buccal eggs.

AMIA NOVAE-GUINEAE (Valenciennes)

Apogon novae-guineae VALENCIENNES, Nouv. Ann. Mus. Hist. Nat. Paris, vol. 1, 1832, p. 53, pl. 4, fig. 1. New Guinea.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 237 (India and Norfolk Island).—MEYER, Ann. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (north Celebes).

Amia novae-guineae BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 97, pl. (41) 319, fig. 5 (Java and New Guinea).—JORDAN and SEALE, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 777 (Negros); Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 17 (Philippines).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 72 (Bulan).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 254 (Iloilo).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 161 (compiled).

Depth $2\frac{1}{4}$ to $2\frac{1}{2}$; head $2\frac{2}{5}$ to $2\frac{3}{4}$, width $1\frac{4}{5}$ to $2\frac{1}{5}$. Snout $4\frac{1}{4}$ to $4\frac{2}{5}$ in head from snout tip; eye $2\frac{3}{4}$ to $3\frac{1}{8}$, greater than snout or interorbital; maxillary reaches opposite hind pupil edge, expansion $1\frac{3}{4}$ to 2 in eye, length $1\frac{1}{10}$ to 2 in head; bands of villiform teeth in jaws, on vomer and palatines; interorbital 4 to $4\frac{1}{5}$, nearly level; preopercle ridge entire, edge minutely serrated. Gill rakers 6+13, lanceolate, greatly longer than gill filaments or about half of eye.

Scales 22 or 23 in lateral line to caudal base and 3 to 5 more on latter; 2 above, 5 below, 3 or 4 predorsal, 2 rows on cheek; muzzle, including maxillary and preorbital naked. Tubes in lateral line large, well exposed and simple. Scales with 8 or 9 basal radiating striae; apical denticles 61 to 90, or transversely with 2 or 3 series of basal elements; circuli fine.

D. VII-I, 9, 1, fourth spine is $2\frac{1}{2}$ to $2\frac{1}{3}$ in total head length, first branched ray $1\frac{3}{5}$ to 2; A. II, 8, 1, second spine $3\frac{1}{3}$ to $3\frac{3}{5}$, first branched ray 2 to $2\frac{1}{2}$; caudal $1\frac{1}{5}$ to $1\frac{1}{4}$, hind edge little emarginate; least depth of caudal peduncle $2\frac{1}{4}$ to $2\frac{3}{5}$; pectoral $1\frac{3}{5}$ to $1\frac{3}{4}$; ventral $1\frac{1}{5}$ to 1%.

Largely pale brown generally, each scale on side with dark median blotch made up of deeper brown dots. Head and whole body with more or less soiled or obscure smutty appearance. From lower eye edge two dark brown bars down over cheek. Iris with coppery tinge. Spinous dorsal soiled deep grayish with several irregular black blotches. Other vertical fins all pale, soft dorsal with sub-basal gray longitudinal band. Paired fins pale, ventrals always with transverse more or less diffuse band at basal fourth. Most examples with obscure diffuse dark streak obliquely from humeral region to anal origin delimiting pale peritoneum. Also usually a pale brown spot at middle of pectoral base.

India, East Indies, Philippines.

One example. Below mouth Mindanao River, Cotabato, Mindanao. May 20, 1908. Length 46 mm.

15305. Busin Harbor, Burias Island. March 8, 1909. Length 38 mm.

Sixteen examples. Canmahala Bay, Luzon. March 11, 1909. Length 33 to 49 mm. Males with buccal ova.

Twenty-one examples. Cataingan Bay, Masbate Island. April 18, 1908. Length 21 to 52 mm.

23168. Cebu market. September 3, 1909. Length 50 mm.

(D. 5174). Jolo Light, E. 2.6 miles ($6^{\circ} 03' 45''$ N., $120^{\circ} 57'$ E.), vicinity of Jolo.

In 20 fathoms. March 5, 1908. Length 44 mm. 1 example.

Twelve examples. Mansalay, Mindoro Island. June 4, 1908. Length 40 to 57 mm.

Five examples. Mati, Pujada Bay, Mindanao. May 15, 1908. Length 27 to 50 mm.

Fifty-seven examples. Nasiput, Mindanao Island. August 1, 1909. Length 28 to 57 mm.

Two examples. Pandanon Island, between Cebu and Bohol. March 23, 1909. Length 43 to 46 mm.

Seven examples. Port Galera, Mindoro. June 9, 1908. Length 28 to 38 mm.

Four examples. Port Matalvi, Luzon. November 23, 1908. Length 37 to 51 mm.

Twenty-eight examples. Port San Vicente, off northern Luzon. November 18, 1908. Length 32 to 51 mm.

23161, 23162. Puerta Princesa, Palawan Island. April 5, 1909. Length 45 to 47 mm.

- Two examples. Reefs south end of Tumindao Island, Tawi Tawi Group, Sulu Archipelago. February 26, 1908. Length 45 to 47 mm. (319). Male with buccal ova.
- Fifteen examples. Saboon Island, Ragay Bay, Ragay Gulf, Luzon Island. March 10, 1909. Length 22 to 48 mm. (1292). Body with brassy luster or sheen. Entire side, head and body with many punctulations of olive. Small black spot at beginning of lateral line and another on head near anterior scale; few blackish dots irregularly on curve of lateral line. First dorsal olivaceous, with brassy tint, second membrane with large black blotch terminally and rest of fin slightly clouded darker, also small rounded black blotch in middle of sixth membrane. Second dorsal pale olive with dusky bar through base. Anal without markings, slightly pinkish. Caudal slightly dusky, with an olive shade. Pectoral hyaline. Ventral olivaceous, dusky toward base.
- One example. Sulade Island, vicinity of Jolo. September 17, 1909. Length 32 mm.
- One example. San Miguel Harbor, Ticao Island. April 2, 1908. Length 27 mm.
- Two examples. San Pascual, Burias Island. March 8, 1909. Length 31 to 40 mm. Male with buccal ova.
- Seventeen examples. Southern lagoon, Tumindao Island, Tawi Tawi Group, Sulu Archipelago. February 26, 1908. Length 39 to 51 mm. (319, 320). Male with dull golden buccal ova. Pale reddish dusky, reds becoming geranium on head and silvery below. Iris like adjacent head. First dorsal with dark brown blotches on membranes. Second dorsal pink, dusky at base. Caudal, anal and ventral pink, latter with dusky bar at base. Pectoral very pale pink.
- Forty-three examples. Surigao, Mindanao. May 8, 1908. Length 34 to 62 mm.
- Seventeen examples. Tataan, Simalue Island, Tawi Tawi Group, Sulu Archipelago. February 18-20, 1908. Length 20 to 41 mm.
- Twelve examples. Danawan and Si Amil Islands, vicinity Sibuko Bay, Borneo. September 27, 1909. Length 28 to 36 mm.
21111. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 40 mm
- Three examples. Great Toba Island, Buton Strait. December 15, 1909. Length 18 to 21 mm.
- Twenty-seven examples. Toba Island. December 15, 1909. Length 16 to 36 mm.

AMIA CARDINALIS Seale

Amia cardinalis SEALE, Philippine Journ. Sci., vol. 4, No. 6, 1909, p. 509. Puerto Princesa, Palawan Island.

Depth $2\frac{3}{4}$ to $2\frac{7}{8}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width 2 to $2\frac{1}{8}$. Snout $4\frac{1}{2}$ to 5 in head from snout tip; eye 3 to $3\frac{1}{4}$, greater than snout or interorbital; maxillary reaches opposite hind eye edge, expansion $1\frac{4}{5}$ to $1\frac{7}{8}$ in eye, length $1\frac{7}{8}$ to 2 in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $4\frac{7}{8}$ to $5\frac{1}{2}$, nearly level; infraorbital and postorbital edges, preopercle ridge and edge serrated and supraorbital edge serrated with age. Gill rakers 5+14, of which 2 upper ones rudiments and others lanceolate, little longer than gill filaments or $2\frac{1}{2}$ in eye.

Scales 23 or 24 in lateral line to caudal base and 4 or 5 more on latter; 2 above, 6 below, 5 or 6 predorsal, 2 rows on cheek; head naked

except cheeks and opercles. Tubes in lateral line each large, well exposed and with small crimped basal scale to each. Scales with 13 to 19 basal radiating striae; 89 to 108 apical denticles, with 2 or 3 series transversely; circuli fine.

D. VI-I, 9, 1, second spine $1\frac{7}{8}$ to 2 in total head length, third ray $1\frac{2}{5}$ to $1\frac{4}{5}$; A. II, 8, 1, second spine $2\frac{2}{3}$ to 3, third ray $1\frac{3}{5}$ to $1\frac{3}{4}$; caudal 1 to $1\frac{1}{10}$, well forked; least depth of caudal peduncle $2\frac{3}{5}$ to $2\frac{4}{5}$; pectoral $1\frac{1}{3}$ to $1\frac{1}{2}$; ventral $1\frac{1}{2}$ to $1\frac{3}{5}$.

Light brown, lighter below. Iris neutral rosy gray. Fins all pale or whitish.

Seale says "this species seems to differ in several respects from *A. erythrumus* to which it is most nearly related." Just what *A. erythrumus* is, unless *Apogon erythrinus* Snyder is intended, we do not know.

14510 (1557). Biri Channel, Balicuatro Island, east coast of Luzon. June 2, 1909.

Length 73 mm. Nearly uniform scarlet vermilion, back somewhat dusky from pale olivaceous submarginal bar on each scale. Fins also bright scarlet vermilion.

(548.) Cataingan Bay, Masbate Island. April 18, 1908. Length 74 mm. Scarlet vermilion, scales olivaceous dusky submarginally on back.

Iris dark umber. Fins uniform scarlet vermilion, except caudal which slightly dusky at tip.

20440. Grande Island Reef. June 8, 1908. Length 36 mm.

5313. Jolo. March 6, 1908. Length 50 mm.

One example. Murcielagos Bay, Mindanao. August 21, 1909. Length 66 mm.

One example. Port Banalacan, Marinduque Island. February 23, 1909. Length 37 mm.

One example. Romblon Reef. March 26, 1908. Length 32 mm.

One example. Saboon Island, Ragay Gulf, Luzon. March 10, 1909. Length 36 mm.

AMIA DIENCAEA Smith and Radcliffe

Amia diencaea SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 431, pl. 34, fig. 1. Sulade Island, Jolo.

Depth $2\frac{2}{3}$; head $2\frac{2}{5}$, width 2. Snout $4\frac{1}{3}$ in head; eye $2\frac{3}{4}$, greatly more than snout or interorbital; maxillary reaches slightly beyond eye, expansion $5\frac{1}{2}$ in eye, length $1\frac{4}{5}$ in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $4\frac{1}{10}$, level; preopercle ridge entire, edge behind little uneven or rough and below entire. Gill rakers 5 + 11, lanceolate, double gill filaments or $2\frac{1}{3}$ in eye, some few above and below as rudiments.

Scales 23 in lateral line to caudal base and 3 more on latter; 3 above, 8 below, 7 predorsal, 2 rows on cheek; head naked, except cheeks and opercles. Tubes in lateral line large, well exposed, each with slight basal scale. Scales with 8 basal radiating striae; 41 apical denticles, with 1 or 2 transverse series of basal elements; curculi fine.

D. VI-I, 9, 1, third spine $2\frac{1}{10}$ in head, first ray $1\frac{1}{5}$; A. II, 8, 1, second spine $2\frac{3}{5}$, first ray $1\frac{3}{5}$; caudal $1\frac{1}{2}$, emarginate behind; least depth of caudal peduncle $2\frac{3}{4}$; pectoral $1\frac{2}{3}$; ventral $1\frac{1}{10}$.

Pale brown generally, nearly uniform. Diffuse pale longitudinal band, but little darker than general color, begins on lateral line above end of pectoral and extends midway along side of caudal peduncle to caudal base and out over caudal fin. Broad blackish brown postocular band extends to pectoral base or over prepectoral space, at first about wide as pupil and narrowing posteriorly. Fins all uniformly pale or whitish.

Known only from the type, a single specimen, No. 70243 U.S.N.M. Sulade Island, Jolo. Length 41 mm.

AMIA SANGIENSIS (Bleeker)

Apogon sangiensis BLEEKER, Nat. Tijds. Nederland. Indië, vol. 13, 1857, p. 375. Sangir Islands.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 235 (copied); Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 20 (Yap).—DAY, Fishes of India, pt. 1, 1875, p. 64, pl. 17, fig. 4; Fauna Brit. India, vol. 1, 1889, p. 500.—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 229 (west coast of Binongka).—BEAUFORT, Bijd. Dierk., Amsterdam, 1913, p. 114 (Beo, Majalibit Bay, Waigiu).—REGAN, Ann. Durban Mus., vol. 1, pt. 1, 1917, p. 458 (Durban, Natal).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 515 (Natal coast).

Amia sangiensis BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 95, pl. (41) 319, fig. 4 (Sangir).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1909), p. 72 (Bulan).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 71, 1927, p. 6 (Benkoelen, Sumatra).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 160 (Ascension Island, Marshalls).

Depth $2\frac{2}{5}$ to $2\frac{3}{5}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{4}$ to $2\frac{1}{3}$. Snout $3\frac{1}{2}$ to 4 in head; eye 3 to $3\frac{1}{8}$, greater than snout or interorbital; maxillary reaches $\frac{2}{5}$ to $\frac{1}{2}$ in eye, expansion $2\frac{1}{4}$ to $2\frac{1}{3}$, length $2\frac{1}{8}$ to $2\frac{1}{4}$ in head; mandible slightly shorter than upper jaw; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $4\frac{3}{5}$ to 5, slightly convex; preopercle ridge entire, edge finely serrate. Gill rakers 5 + 18, lanceolate, little greater than gill filaments or $\frac{1}{3}$ of eye.

Scales 22 or 23 in lateral line to caudal base and 2 or 3 more on latter; 2 above, 6 below, 5 or 6 predorsal, 2 rows on cheek to preopercle ridge; muzzle, including maxillary and suborbitals, also top of head naked. Tubes in lateral line large, well exposed, each with small basal scale. Scales with 4 to 11 basal radiating striae; 40 to 65 apical denticles, sometimes with single row of basal elements; circuli fine.

D. VI-I, 9, 1, fourth spine $1\frac{1}{4}$ to $1\frac{1}{2}$ in head, second ray $1\frac{1}{2}$ to $1\frac{7}{8}$; A. II, 8, 1, second spine $2\frac{1}{3}$ to $2\frac{7}{8}$, first ray $1\frac{2}{3}$ to $1\frac{7}{8}$; caudal $1\frac{1}{8}$ to $1\frac{1}{4}$, well emarginate; least depth of caudal peduncle $2\frac{2}{5}$ to $2\frac{3}{5}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{2}{3}$ to $1\frac{1}{5}$.

Brown, lower half of head and abdomen whitish. Blackish brown band from snout tip through eye and over postocular about as wide as pupil. Small black spot, less than pupil at middle of caudal base. Spinous dorsal blackish apically, fin otherwise grayish. Fins all pale otherwise, lower ones little more whitish.

Andamans, East Indies, Philippines, Micronesia. Bleeker's figure of this species is inaccurate, as it shows four rows of scales across the cheek.

One example. Cataingan Bay, Masbate. April 18, 1908. Length 27 mm.

Three examples. Cebu market. March 28, 1909. Length 21 to 35 mm.

23167. Cebu market. September 3, 1909. Length 63 mm.

One example. Mati, Pujada Bay, Mindoro. May 15, 1908. Length 35 mm.

Thirteen examples. Nasipit, Mindanao. August 1, 1909. Length 34 to 59 mm.

Seven examples. Near Palag Bay, Luzon. June 16, 1909. Length 44 to 60 mm.

Thirty examples. Tataan, Tawi Tawi Group. February 20, 1908. Length 21 to 47 mm.

Two examples. Tataan. February 21, 1908. Length 51 to 53 mm.

6150. Tonquil Island, east of Gumila Reef. September 14, 1909. Length 40 to 58 mm. 72 examples.

Fifteen examples. Daisy Islet, west of Bumbum, Trusan Tando Bulong, British North Borneo. January 6, 1910. Length 43 to 58 mm.

AMIA HYALOSOMA (Bleeker)

Apogon hyalosoma BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 63. Sumatra (no diagnosis; on *Apogon thermalis*, not CUVIER, BLEEKER, 1849); vol. 5, 1853, p. 329 (Amboina; Batavia, Samarang, Java; Bima, Sumbawa; Benculen, Padang, Priaman, West Sumatra).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 231 (Amboyna).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 42 (Puynipet, Java).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 19 (fresh water, Seychelles).—PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 256 (Paracali, Luzon).—MARTENS, Reisen Ost. Afrika von der Decken, vol. 3, pt. 1, 1869, p. 141 (Seychelles).—DAY, Fishes of India, pt. 1, 1875, p. 64, pl. 17, fig. 5.—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Sarangoon River, Singapore).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (Cebu; Rubi, New Guinea).—DAY, Fauna Brit. India, vol. 1, 1889, p. 500.—JATZOW and LENZ, Abh. Senckenberg. Naturf. Ges., vol. 21, 1889, p. 499 (Zanzibar).—ELERA, Cat. Fauna Filip., 1895, p. 469 (Cebu).—WEBER, Semon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 263 (fresh water of Amboina).—FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 518 (Padang); Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 527 (Padang material).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 230 (Makassar).

Amia hyalosoma BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 96, pl. (31) 309, fig. 1 (Sumatra, Nias, Singapore, Biliton, Java, Sumbawa, Celebes, Amboina, Luzon).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 254 (Mindoro and Calayan).—SEALE, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 274 (Sandakan, Borneo).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 160 (compiled).

Apogon thermalis (not CUVIER) BLEEKER, Verh. Batav. Genootsch. (Perc.), vol. 22, 1849, p. 27 (Batavia and Samarang, Java).

Apogon armatus THIOLLIÈRE, Fauna Woodlark, 1857, p. 144. Woodlark Island.

Mionorus graeffei (not GÜNTHER) JORDAN and SEALE, Bull. Bur. Fisher. vol. 25, 1905 (1906), p. 247 (Apia).

Mionorus graeffei FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 163 (part)

Depth $2\frac{1}{5}$ to $2\frac{1}{2}$; head $2\frac{1}{5}$ to $2\frac{1}{4}$, width $2\frac{1}{6}$ to $2\frac{1}{4}$. Snout $3\frac{5}{8}$ to $4\frac{1}{8}$ in head from snout tip; eye 3 to 4, greater than snout or interorbital; maxillary reaches opposite hind eye edge, opposite hind pupil edge in young, expansion $1\frac{3}{5}$ to $1\frac{4}{5}$ in eye, length $1\frac{3}{4}$ to 2 in head; teeth fine, villiform, in bands in jaws, on vomer and palatines; interorbital $4\frac{1}{2}$ to 5, level; preopercle edge and ridge entire. Gill rakers 2+5, also 2 rudiments above and 4 below; long as gill filaments or $2\frac{1}{2}$ in eye.

Scales 20 to 25 in lateral line to caudal base and 4 or 5 more on latter; 3 above, 6 or 7 below, 8 predorsal, 2 rows on cheek to preopercle ridge. Tubes in lateral line large, simple, well exposed, each with small basal, crimped scale. Scales with 17 basal radiating striae; 46 to 186 apical denticles, with 2 to 16 transverse series of basal elements; circuli fine.

D. VI-I, 8, 1 or 9, 1, second spine $1\frac{7}{8}$ to $2\frac{1}{4}$ in total head length, second ray $1\frac{3}{5}$ to $1\frac{4}{5}$; A. II, 8, 1, second spine $2\frac{3}{5}$ to $3\frac{3}{4}$, second ray $1\frac{3}{4}$ to $2\frac{1}{5}$; caudal $1\frac{1}{3}$ to $1\frac{2}{5}$, hind edge slightly emarginate; least depth of caudal peduncle $2\frac{2}{5}$ to $2\frac{3}{5}$; pectoral $1\frac{2}{3}$ to $1\frac{3}{4}$; ventral $1\frac{4}{5}$ to $1\frac{7}{8}$.

Brown, sides and lower surfaces much paler. Often brassy tinge on middle of side. Muzzle with more or less drab brown or gray. Iris pale, with neutral gray tints. Dorsals and caudal brownish, other fins pale. Neutral black blotch, nearly large as eye at caudal base medianly. Spinous dorsal with dusky or neutral black band on front of second membrane close along and behind second spine. Small neutral dusky spot each side at base of last anal ray, in young reflected variously as dark diffuse blotch on lower side of caudal peduncle. Our smallest examples show the dark caudal spot rather diffuse and less contrasted than with age. They also have the bases of soft dorsal and anal decidedly dark brown.

Zanzibar, Seychelles, East Indies, Philippines, Melanesia.

23205, 23206. Alimango River, Burias Islands. February 26, 1908. Length 107 to 138 mm.

5484. Basud River, Luzon. June 15, 1909. Length 40 to 144 mm. 7 examples. Nine specimens. Caiholo River, Ulugan Bay, Palawan Island. December 29, 1908. Length 70 to 103 mm.

Nine specimens. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 122 to 156 mm. Of these 4 males with buccal ova.

23887, 23888. Cataingan Bay, Masbate Island. April 18, 1908. Length 50 to 102 mm.

11510 to 11513. Dumaca River. February 25, 1909. Length 133 to 156 mm.

- 23540 to 23542. Hakoda Bay, Palawan Island. December 31, 1908. Length 108 to 133 mm.
- 6558 to 6559. Head of Baheli River, Ulugan Bay, Palawan Island. December 28, 1908. Length 135 to 141 mm.
11397. Ioni River, Tayabas Bay, Marinduque Island. February 25, 1909. Length 150 mm.
- 12310 to 12313. Lagonoy Gulf, stream at Maagnas, Luzon. June 17, 1909. Length 110 to 141 mm.
- 6217 to 6220. Mantaquin Bay, eastern Palawan. April 2, 1909. Length 112 to 148 mm.
11675. Mariveles Bay, Luzon. January 30, 1909. Length 131 mm.
- 23596, 23597. Nato River, tidal, Luzon. June 18, 1909. Length 29 to 151 mm. 9 examples.
- Nine examples. Near mouth of Tayabas River, Luzon. February 25, 1909. Length 29 to 130 mm. One male with buccal ova.
- 23804 to 23811. Nonucan River, Camp Overton, Mindanao Island. August 6, 1909. Length 69 to 133 mm.
- One example. Paluan River, Mindoro. December 11, 1908. Length 59 mm.
- 7597 to 7601, 19636. Paneol, from creek at head of tide water, Malampaya Island, Palawan. December 25, 1908. Length 121 to 154 mm.
- Eleven examples. Pangauran River, Port Caltom, Busuanga Island. December 16, 1908. Length 40 to 96 mm.
23885. Port Palapag, Luzon. June 2, 1909. Length 105 mm.
- Three examples. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 55 to 124 mm.
- 4993, 4994, 23403. Ragay River, Ragay Gulf, fresh water, Luzon. March 10, 1909. Length 73 to 160 mm.
- One example, near village at Chase Head, Endeavor Strait, Palawan Island. December 22, 1908. Length 45 mm.
- Twenty examples. Verde del Sur Island, Palawan Island. April 7, 1909. Length 95 to 160 mm.
20750. Sebatie Island, Borneo. October 1, 1909. Length 131 mm.
- 23886, 24010, 2079. Powati Harbor, Makyan Bay, Makyan Island, Molucca Passage. November 28, 1909. Length 43 to 113 mm. Translucent, with vermilion dusting. Dusky vermilion stripe from snout to caudal spot. Iris silvery. Fins vermilion. Caudal brown at tips.
- 23589 to 23591. Tifu Bay, Bouro Island. December 10, 1909. Length 32 to 55 mm. 24 examples.
- Two examples. Togian Bay, Togian Island, Gulf of Tomini, Celebes. November 19, 1909. Length 41 to 45 mm.
- Seven examples. Pendek Island, Buton Strait. December 15, 1909. Length 36 to 47 mm.
- 13298, 24052, 24053. Gomomo Island, Pitt Passage. December 3, 1909. Length 27 to 57 mm.
- 52407 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 45 to 54 mm. 5 examples. As *Mionorus graeffi*.

AMIA CYPSELURA (Weber)

Rhabdamia cypselurus WEBER, Notes Leyden Mus., vol. 39, 1909, p. 167.
Kawa, West Ceram; Siboga Exp., vol. 57, Fische, 1913, p. 242, fig. 60 (Kawa).

Depth $3\frac{2}{5}$ to $3\frac{3}{5}$; head $2\frac{3}{5}$ to $2\frac{3}{4}$, width $2\frac{1}{2}$ to $2\frac{3}{4}$. Snout 4 to $4\frac{1}{3}$ in head from snout tip; eye $3\frac{2}{5}$ to $3\frac{1}{2}$, greater than snout or

interorbital; maxillary reaches $\frac{1}{2}$ to $\frac{2}{3}$ in eye, expansion $2\frac{1}{3}$ to $2\frac{1}{2}$, length 2 to $2\frac{1}{10}$ in head; teeth minute, in narrow bands in jaws, on vomer and palatines; interorbital 4 to $4\frac{1}{2}$, very slightly convex; preorbital edge, also preopercle edge and ridge entire; suborbital, preopercle and cranial regions venulose. Gill rakers 5+11, of which 2 upper rudiments, others lanceolate and greatly longer than gill filaments or 2 in eye.

Scales 22 or 23 in lateral line to caudal base and 2 or 3 more on latter; 2 above, 6 below, 3 predorsal, 2 rows on cheek; head, except cheek and opercles, naked. Tubes in lateral line slender, well exposed, simple. Scales with 3 or 4 weak basal marginal striae; circuli moderate.

D. VI-I, 9, 1, third spine $2\frac{1}{3}$ to 3 in total head length, first ray $1\frac{3}{4}$ to $2\frac{1}{10}$; A. II, 9, 1, second spine $3\frac{1}{2}$ to 4, first ray $1\frac{1}{3}$ to $2\frac{1}{10}$; caudal $1\frac{1}{4}$ to $1\frac{2}{5}$, deeply forked; least depth of caudal peduncle $3\frac{1}{2}$ to $3\frac{3}{5}$; pectoral $1\frac{1}{2}$ to $1\frac{4}{5}$; ventral $2\frac{1}{4}$ to $2\frac{2}{5}$.

Very pale or light brown, with silvery white shade on opercle. Tip of snout and chin dusky, former usually extended as narrow dusky brown bar to eye, crossing same horizontally and back indistinctly over postocular to tip of opercle. Fins very pale to whitish, caudal with brownish band submarginally above and below along each lobe.

East Indies, Philippines.

Three examples. Bolalo Bay, Palawan Island. December 21, 1908. Length 40 to 45 mm.

Four examples. Bolinao Bay, west Luzon. May 10, 1909. Length 40 to 43 mm.

One example. Busin, Burias Island. March 8, 1909. Length 39 mm.

Five examples. Canmahala Bay, Luzon. March 11, 1909. Length 40 to 47 mm.

Eight examples. Port Jamelo, Luzon. July 13, 1909. Length 33 to 47 mm.

One example. Port Palapag, Luzon. June 3, 1909. Length 25 mm.

Sixteen examples. Rasa Island, Mantaquin Bay, Palawan. April 1, 1909. Length 32 to 43 mm.

Two examples. Tataan Island, Sulu Archipelago. February 21, 1908. Length 47 to 49 mm.

Sixty-six examples. Tutu bay, Jolo Island. September 19, 1909. Length 40 to 50 mm. (1962). Without lateral stripe. Dusky band across preorbital, continued obscurely across premaxillary and mandible tip, behind eye extends across opercle. Vertical fins hyaline pink, somewhat brownish line at anal base on body, much less distinct on dorsal. Brown stripe through each caudal lobe.

Two examples. Ulugan Bay near mouth of Baheli River. December 28, 1908. Length 41 to 42 mm.

Seventy-nine examples. Tomahu Island, Bouro. December 12, 1909. Length 28 to 52 mm. Male with buccal ova.

Sixteen examples. Makasser, Celebes. December 16, 1909. Length 41 to 51 mm.

23415. Gane Road, Gillolo Island. December 1, 1909. Length 34 mm.

Subgenus LEPIDAMIA Gill

Body elongate, depth more than half length. Scales small, 36 in lateral line.

AMIA MULTITAENIATA (Cuvier)

Apogon multitaeniatus (EHRENBERG) CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 159. Red Sea.—RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 47 (name).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 713 (Koseir, Red Sea).—DAY, Proc. Zool. Soc. London, 1870, p. 681 (Andamans); Fishes of India, pt. 1, 1875, p. 57, pl. 16, fig. 1 (Madras and Bombay); Fauna Brit. India, vol. 1, 1889, p. 491.

Apogon (Lepidamia) multitaeniatus KLUNZINGER, Fische Roth. Meer., 1884, p. 20.

Apogon noordzieki BLEEKER, Nat. Tijds. Nederland. Indië, vol. 19, 1859, p. 336. Patjitian, Java.—MEYER, Anal. Soc. Espan. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (Cebu).

Amia noordzieki BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 77 (Java); vol. 8, 1876-77, pl. (74) 352, fig. 1.

Apogon taeniatus (not CUVIER) DAY, Fishes of India, pt. 1, 1875, p. 101 (note).

Depth $2\frac{1}{2}$; head $2\frac{2}{3}$, width 2. Snout $3\frac{4}{5}$ in head; eye $3\frac{4}{5}$, subequal with snout or interorbital; maxillary reaches $\frac{3}{4}$ in eye, expansion $1\frac{4}{5}$, length 2 in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital 4, only very slightly convex; preopercle ridge entire and edge minutely serrated. Gill rakers 6 + 13, lanceolate, greatly more than gill filaments or $1\frac{3}{4}$ in eye.

Scales 36 in lateral line to caudal base and five more on latter; 4 above, 10 below, 7 predorsal, 4 rows on cheek; head naked, except cheeks and opercles. Tubes in lateral line large, well exposed and each with broad crimped scale. Scales with 13 to 18 basal radiating striae; 47 to 103 apical denticles with 2 transverse series of basal elements; circuli fine.

D. VIII-I, 9, I, fourth spine $2\frac{1}{4}$ in head, second ray $1\frac{1}{2}$; A. II, 8, I, second spine $2\frac{7}{8}$, second ray $1\frac{2}{3}$; caudal $1\frac{1}{8}$, deeply emarginate; least depth of caudal peduncle $1\frac{1}{6}$; pectoral $1\frac{1}{2}$; ventral $1\frac{3}{5}$.

Brown, paler on under surfaces. About 5 longitudinal darker lines above lateral line and parallel with its course, below 11 horizontally. Iris slaty. Fins all grayish, spinous dorsal dusky brown terminally and soft dorsal with dusky brown basal band next to subbasal whitish one.

Red Sea, India, Andamans, East Indies, Philippines.

14238 (1107). Mariveles wharf, Manila Bay, Luzon. January 30, 1909. Length 124 mm. General color dusky red, fading to pearly. Dusky stripes along and between scale rows. Fins bright carmine. First dorsal largely covered by blackish blotch.

Genus ARCHAMIA Gill

Archamia GILL, Proc. Acad. Nat. Sci. Philadelphia, 1863, p. 81. Type *Apogon bleekeri* GÜNTHER, monotypic.

Head rather large. Teeth in villiform bands in jaws, on vomer and palatines. Preopercle ridge with flat spine at angle, otherwise entire; preopercle edge often with minute serrae. Gill rakers 13 to 16 on lower branch of first arch. Scales large, 22 to 24 in lateral line to caudal base. Lateral line complete. Dorsals separate, spinous fin with 6 spines and soft fin with spine and 9 rays. Anal with 2 spines and 13 to 17 rays. Caudal emarginate.

This genus is known chiefly for its long anal fin. Most all the species studied below with a black basal caudal spot.

ANALYSIS OF THE SPECIES

- a*¹. ARCHAMIA. Body deeper, depth less than 3.
- b*¹. No broad, dark, transverse median band.
- c*¹. Short, vertical, dark bar behind gill opening usually present... *bleekeri*
- c*¹. No short, vertical dark bar behind gill opening ever present.
- d*¹. Median dark predorsal line, second dark line from above snout to last dorsal rays, third from snout nearly to caudal... *buruensis*
- d*². No dark longitudinal lines... *lineolata*
- b*². Broad, dark, median transverse band from soft dorsal to belly... *zosterophora*
- a*². IOAMIA new subgenus. Body slender, depth 3 to $3\frac{2}{5}$; dark median lateral longitudinal band... *gracilis*

Subgenus ARCHAMIA Gill

Body deep, depth less than 3. Species seldom with dark median longitudinal band.

ARCHAMIA BLEEKERI (Günther)

Apogon bleekeri GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 245. Amboyna.

Archamia bleekeri FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 519 (Padang, Sumatra).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 75 (Bacon and San Fabian).

Apogon macropterus (not CUVIER) BLEEKER, Nat. Tijds. Nederland. Indië, vol. 2, 1851, p. 168 (Padang).

Depth $2\frac{1}{4}$ to $2\frac{1}{3}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{2}$ to $2\frac{3}{5}$. Snout $4\frac{2}{5}$ to 5 in head from snout tip; eye 3 to $3\frac{1}{5}$, greater than snout or interorbital; maxillary reaches half way in eye, expansion $2\frac{1}{5}$ to $2\frac{2}{3}$, length 2 in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital 4 to $4\frac{1}{2}$, preopercle ridge entire with broad flat spine at angle, lower edge and around angle minutely serrate, upper hind edge entire. Gill rakers 6 + 13, lanceolate, greatly longer than gill filaments or $1\frac{2}{3}$ in eye.

Scales 24 or 25 in lateral line to caudal base and 4 more on latter; 2 above, 6 below, 6 predorsal, 2 rows on cheek to preopercle ridge; muzzle, including maxillary, suborbitals and interorbital, naked. Tubes in lateral line large, well exposed, each with small basal auxiliary scale. Scales with 13 to 18 basal radiating striae, with scalloped edge to scale; 75 to 80 small apical denticles, with 1 or 2 transverse series of basal elements; circuli fine.

D. VI-I, 9, 1, third spine $2\frac{1}{8}$ to $2\frac{1}{5}$ in total head length, first ray $1\frac{2}{5}$ to $1\frac{3}{5}$; A. II, 16, 1, or 17, 1, second spine $2\frac{3}{5}$ to $2\frac{3}{4}$, first ray $1\frac{2}{5}$ to 2; caudal $1\frac{1}{8}$ to $1\frac{1}{4}$, little emarginate behind; caudal peduncle depth $2\frac{2}{5}$ to $2\frac{4}{5}$; pectoral $1\frac{1}{4}$ to $1\frac{1}{2}$; ventral $1\frac{7}{8}$ to 2.

Brown, paler and much lighter on sides and below. Side of head and body sprinkled with numerous deep brown dots, forming transverse lines on trunk and tail. Lower side of head and abdomen with pale lilac to violet and greenish reflections, with silvery tints. Iris whitish, with some gray tints. Behind tip of opercle flap at humeral region vertical dusky brown blotch little more than pupil. Also variable diffuse dusky brown blotch at caudal base, never larger than eye, sometimes absent. Fins all pale.

East Indies, Philippines.

One example. Batangas market, Verde Island. June 7, 1908. Length 81 mm. 17033. Bisucay Island, near Cuyo. April 9, 1909. Length 68 mm. (1518).

Two examples. Bolalo Bay, Palawan Island. February 21, 1908. Length 39 to 56 mm.

23800. Bolalo Bay. December 21, 1908. Length 81 mm.

6112, 6113, 6116. Bolinao Bay, west coast of Luzon. May 10, 1909. 39 examples.

15812, 15813, 15818, 23428, 23429, 23430. Butauanan Island, east coast of Luzon. June 13, 1909. Length 68 to 88 mm.

15496. Butauanan Island. June 15, 1909. Length 85 mm.

21048. Capunuyupugan, Mindanao. May 9, 1908. Length 74 mm.

14846. Casogoran, Malhon Island. July 27, 1909. Length 66 mm.

8131. Dasol Bay, west coast of Luzon. May 9, 1909. Length 62 mm.

Thirty-four examples. Maagnas, Lagonoy Gulf, Luzon. June 17, 1909. Length 40 to 61 mm.

5750. Mahinog, Camiguin Island, between Leyte and Mindanao. August 3, 1909. Length 86 mm.

Five examples. Port Ciego, Balabac. January 3, 1909. Length 54 to 80 mm.

One example. Puerta Princesa, Palawan. April 5, 1909. Length 42 mm.

23867. Rapurapu Island, east coast of Luzon. June 22, 1909. Length 45 mm.

11326. San Roque, Leyte. July 29, 1909. Length 61 to 73 mm. 24 examples.

Two examples. Tifu Bay, Bouro Island, Dutch East Indies. December 10, 1909. Length 65 mm.

Four examples. Tomalu Island. December 12, 1909. Length 36 to 41 mm.

9686, 22367. Uki, Bouro Island. December 9, 1909. Length 60 to 78 mm. 5 examples.

18707 and 13708. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 71 to 74 mm.

23456. Limbe Strait, Celebes. November 10, 1909. Length 77 mm.

23547, 23548. Talisse Island, north of Celebes. November 9, 1909. Length 70 to 71 mm. Bright yellow stripe across snout from eye to eye, washed across iris. Dash of black on cheek under eye about pupil width. Black blotch size of pupil at upper angle of gill opening.

23504. Una Una Road, Binang Unang, Gulf of Tomini, Celebes. November 17, 1909. Length 68 mm.

One example. Tana Keke Island, Flores Sea. December 21, 1909. Length 41 mm.

- 23796, 23798. Makyan Island. November 29, 1909. Length 73 or 74 mm. 3 examples.
- 23627, 23799. Powati Harbor, Makyan Island. November 28, 1909. Length 70 to 84 mm.
23531. Tidore Island, south of Ternate. November 25, 1909. Length 77 mm.
23412. Gane Road, Gillolo Island. December 1, 1909. Length 73 mm.
- 8400, 8402, 8403, 8405 to 8407. Hokuho, So Wan, Formosa. January 29, 1910. Length 68 to 87 mm.
18420. So Wan. January 28, 1910. Length 73 mm.

ARCHAMIA BURUENSIS (Bleeker)

- Apogon buruensis* BLEEKER, Nat. Tijds. Nederland. Indië, vol. 11, 1856, p. 394. Kajeli, Bouro.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 245 (copied).
- Amia buroensis* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 102 (type); vol. 8, 1876-77, pl. (75) 353, fig. 2.
- Apogonichthys buruensis* FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 164 (compiled).

Depth $2\frac{2}{3}$ to 3; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{5}$ to $2\frac{2}{5}$. Snout 4 to $4\frac{1}{2}$ in head from snout tip; eye $3\frac{2}{5}$ to $3\frac{1}{2}$, greater than snout or interorbital; maxillary reaches $\frac{1}{2}$ to $\frac{3}{5}$ in eye, expansion $2\frac{1}{3}$ to $2\frac{3}{5}$, length $2\frac{1}{5}$ to $2\frac{1}{4}$ in head; teeth villiform, in rather narrow bands in jaws and on vomer and palatines; interorbital $4\frac{3}{5}$ to $5\frac{1}{3}$, very slightly convex; preopercle ridge entire or only with short spine at angle and edge serrated. Gill rakers 6 + 16, of which 2 upper rudiments, others lanceolate or $\frac{1}{2}$ of eye.

Scales 23 or 24 in lateral line to caudal base and 4 or 5 more on latter; 2 above, 6 below, 6 or 7 predorsal, 2 rows on cheek; head naked, except scales on cheek and opercles. Each tube of lateral line well exposed, with small exposed basal scale. Scales with 10 or 11 basal radiating striae; 30 to 57 apical denticles in 2 or 3 transverse series; circuli moderate.

D. VII-I, 9, 1, second spine $2\frac{2}{5}$ to $2\frac{1}{2}$ in total head length, first ray $1\frac{1}{3}$ to $1\frac{1}{2}$; A. II, 12, 1, or 13, 1, second spine $2\frac{3}{5}$ to 3, first ray $1\frac{2}{3}$ to $1\frac{7}{8}$; caudal $1\frac{1}{5}$ to $1\frac{1}{3}$, slightly concave behind; least depth of caudal peduncle $2\frac{1}{2}$ to $2\frac{7}{8}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{7}{8}$ to 2.

Light brown generally, much paler below, with silvery to lilac or pale purplish tinge on lower half of trunk and front of tail. Median dark brown predorsal line extending back to form dark edge along bases of both dorsals. Second dark brown line or narrow band from above snout, over eye and back toward and below bases of last dorsal rays. Third broader dark or blackish brown band from snout tip through eye, not wider than pupil and following along median axis of trunk nearly to middle of caudal base, where round blackish brown blotch about size of pupil, subbasally on abdomen close above anal base brown line and extending back along each side of caudal peduncle below. Iris silvery white, except as crossed by dark horizontal band.

Fins all pale to whitish, front edges of both dorsals rather narrowly brownish.

This species was known to Bleeker from a single example 64 mm. long obtained at Kajeli. To the present time it does not seem to have been obtained except as represented by our materials.

Forty-five specimens. Below mouth of Mindanao River, Mindanao. May 20, 1908. Length 32 to 68 mm.

23751 to 23753. Mantaquin Bay, Palawan Island. April 2, 1909. Length 69 to 86 mm.

8486. Port Dupon, Leyte Island. March 17, 1909. Length 56 mm.

One example. N. Lat. 20° 31' E. Long. 115° 49' (China Sea, vicinity of southern Luzon Island). In 265 fathoms. Length 81 mm. August 8, 1909.

One example. Philippines. Length 81 mm.

23584 to 23586. Tifu Bay, Bouru Island. December 10, 1909. Length 65 to 81 mm. 12 examples.

ARCHAMIA LINEOLATA (Cuvier)

Apogon lineolatus (EHRENBERG) CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 160. Red Sea.—RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 47, pl. 12, fig. 1 (Massauah); Neue Wirbelth., Fische, 1835, p. 88 (Massauah).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 244 (copied).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 710 (Red Sea).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 516 (Delagoa Bay).

Apogon (Archamia) lineolatus KLUNZINGER, Fische Roth. Meer., 1884, p. 19. *Archamia lineolata* JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 252, pl. 38, fig. 1 (Pago Pago and Apia); vol. 26, 1906 (1907), p. 17 (Cavite).—SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 242 (Zamboanga).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 236 (Lombok, Biaru; Salibabu; west Ceram; Saleyer).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 32 (Samoa); Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 219 (Delagoa Bay); 1927, p. 274 (Santa Maria and Bacon); Mem. Bishop Mus., vol. 10, 1928, p. 164 (Apia).

Apogon macropterus (KÜHL and VAN HASSELT) CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 160. Java.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 244 (copied).—DAY, Fishes of India, pt. 1, 1875, p. 64, pl. 17, fig. 4 (Madras).—OGILBY, Proc. Roy. Soc. Queensland, vol. 21, 1908, p. 23 (Dunk Island).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 71, pt. 1, 1907, p. 129 (Gischin, Sokotra).—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 13, 1907, p. 204 (Tulcar Bay, Madagascar).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 516 (Natal coast, Mozambique).

Amia macroptera BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 103 (Sumatra, Pinang, Singapore, Banka, Lepar, Java, Bawean, Bali, Celebes, Ternate, Halmahera, Batjan, Amboina); vol. 8, 1876-77, pl. (68) 346, fig. 2.

Apogon zeylonicus CUVIER, Hist. Nat. Poiss., vol. 3, 1829, p. 491. Ceylon.—PETERS, Arch. Naturg., 1855, p. 234 (Mozambique).

Apogon argenteus VALENCIENNES, Nouv. Ann. Mus. Hist. Nat. Paris, vol. 1, 1832, p. 60. Vanicolo.

Apogon fucatus CANTOR, Cat. Malayan Fishes, 1850, p. 4. Sea of Pinang.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 244 (copied).

Apogon macropterooides BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 724. Lepar Island.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 245 (copied).—PLAYFAIR, Fishes of Zanzibar, 1867, p. 20 (Zanzibar).

Archamia mucropteroides EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 74 (Bacon).—JORDAN and RICHARDSON, Mem. Carnegie Mus., vol. 6, No. 4, 1909, p. 181 (Takao, Formosa).—FOWLER, Proc. Acad. Nat. Sci., Philadelphia, 1927, p. 274 (Bacon).

Apogon notata (not *Sparus notatus* HOUTTUYN) DAY, Proc. Zool. Soc. London, 1867, p. 936. Madras.

Archamia notata JORDAN and METZ, Mem. Carnegie Mus., vol. 6, No. 4, 1909, p. 181, pl. 69 (Takao, Formosa).

Depth $2\frac{1}{4}$ to 3; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{8}$ to $2\frac{3}{4}$. Snout 4 to $4\frac{1}{2}$ in head from snout tip; eye $2\frac{7}{8}$ to $3\frac{1}{4}$, greater than snout or interorbital; maxillary reaches opposite middle of eye to $\frac{3}{5}$, expansion 2 to $2\frac{1}{2}$ in eye, length $1\frac{7}{8}$ to $2\frac{1}{8}$ in head; teeth minute, villiform, in bands in jaws, also few weak ones in band on vomer and palatines; interorbital $3\frac{3}{5}$ to $4\frac{1}{8}$, slightly convex; preopercle ridge entire, with broad short spine at angle, hind edge entire and lower edge and around angle finely denticulate. Gill rakers 3 or 4 + 16, with 2 or 3 rudimentary tubercles also above and below; length greater than gill filaments or 2 in eye.

Scales 22 to 24 in lateral line to caudal base and 3 or 4 more on latter; 2 or 3 above, 6 or 7 below, 5 or 6 predorsal with slight median ridge; 1 or 2 rows of cheek scales to preopercle ridge at angle; muzzle, including interorbital, maxillary and suborbitals, naked; median lateral scales deeply and narrowly imbricated. Scales with 2 to 15 basal radiating striae; 18 to 88 small weak apical denticles, with 2 or 3 transverse series of basal elements; circuli fine.

D. VI—I, 9, 1, third spine $2\frac{1}{8}$ to $2\frac{2}{3}$ in total head length, first ray $1\frac{1}{2}$ to $1\frac{2}{3}$; A. II, 13, 1, to 17, 1, second spine $2\frac{1}{2}$ to $2\frac{3}{4}$, first ray $1\frac{2}{3}$ to 2; caudal $1\frac{1}{6}$ to $1\frac{1}{4}$, hind edge slightly emarginate; least depth of caudal peduncle $2\frac{1}{5}$ to $2\frac{1}{2}$; pectoral $1\frac{1}{5}$ to $1\frac{1}{3}$; ventral $1\frac{3}{4}$ to 2.

Pale brown generally, little paler below, sides and below with silvery and pale lilac tints. Entire side of head and body with underlaid dull or obsolete brownish dots. Iris whitish or grayish. Diffuse dark or dusky brown blotch at caudal base, little less than eye, usually very conspicuous or contrasted. Fins all uniformly pale brownish.

Red Sea, East Africa, Zanzibar, Mozambique, Madagascar, India, Ceylon, East Indies, Philippines, Formosa, Queensland, Melanesia, Micronesia, Polynesia.

TYPICAL FORM

15162, 16292. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 58 to 62 mm. 3 examples.

5592. Batangas market, east coast of Luzon. June 7, 1908. Length 78 to 86 mm. 7 examples.

15061. Canmahala Bay, Luzon. March 11, 1909. Length 54 to 65 mm. 8 examples.

Two examples. Endeavor Strait, northwest Palawan. December 23, 1908. Length 38 to 40 mm.

17331. Isabel, Basilan Island, South of Zamboanga. September 11, 1909. Length 66 mm.
7736. Jolo market. February 12, 1908. Length 86 mm.
- Four examples. Maagnas, Lagonoy Gulf, Luzon. June 17, 1909. Length 55 to 59 mm.
- 23482, 23483. Mariveles wharf, Manila Bay, Luzon. January 30, 1909. Length 68 to 74 mm.
- Three examples. Port Ciego, Balabac. January 3, 1909. Length 46 to 71 mm.
- Six examples. Port Jamelo, Luzon. July 13, 1908. Length 49 to 58 mm.
- Thirty-five examples. Puerta Princesa, Palawan Island. April 5, 1909. Length 32 to 78 mm.
- Ninety-seven examples. Rasa Island, Mantaquin Bay, Palawan. April 1, 1909. Length 22 to 75 mm.
- Seven examples. Tara Island. December 15, 1908. Length 22 to 30 mm.
- Ten examples. Tataan Island, Tawi Tawi Group. February 21, 1908. Length 67 to 74 mm.
- Four examples. Tutu Bay, Jolo market, first anchorage. September 19, 1909. Length 74 to 79 mm.
10444. Varadero Bay, Mindoro. July 23, 1908. Length 60 mm.
15868. Danawan and Si Amil Islands, Darvel Bay vicinity, Borneo. September 26, 1909. Length 72 to 79 mm.
23587. Tifu Bay, Bouro Island, Dutch East Indies. December 10, 1909. Length 67 to 76 mm. 8 examples.
- Nine examples. Tomahu Island. December 12, 1909. Length 35 to 78 mm.
- 23628, 23629, 23786. Powati Harbor, Makyau Island. November 29, 1909. Length 65 to 76 mm.
- 18115 to 18117, 18119, 18498 to 18500. Tana Keke Island, Flores Sea. December 21, 1909. Length 68 to 75 mm.
23411. Gane Road, Gillolo Island. December 1, 1909. Length 65 to 75 mm. 9 examples.
- 13056 and 13513. Gomomo Island, Pitt Passage. December 3, 1909. Length 52 to 58 mm.

FUCATA FORM

16291. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 52 mm.
- 23789 and 23790. Alimango Bay, Burias Island. March 5, 1909. Length 50 to 57 mm.
- Three examples. Bolalo Bay, Malampaya Sound, Palawan Island. December 21, 1908. Length 40 to 43 mm.
- 6111, 6114, 6115. Bolinao Bay, west coast Luzon. May 10, 1909. Length 47 to 48 mm.
- Three examples. Busin Harbor, Burias Islands. March 8, 1909. Length 48 to 63 mm.
- 15811, 15813, 15818, 23430. Butauanan Island, east coast Luzon. June 13, 1909. Length 76 to 81 mm.
- Thirteen examples. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 32 to 69 mm.
21048. Capunuyupugan, Generale Island, east coast Mindanao. May 9, 1908. Length 71 mm.
- One example. Caracaran, Batan Island, east coast Luzon. June 8, 1909. Length 29 mm.
- Fourteen examples. Cebu market, Cebu. March 19, 1909. Length 30 to 69 mm. [1405.] Translucent, with numerous fine pink specks. Fins pink, without distinct bars.

- 120, 121, 124 to 126, 128, 130, 131, 23492, 24071. Endeavor Strait, Malampaya Sound, Palawan Island. December 23, 1908. Length 52 to 69 mm. 11 examples.
- 17330, 17332, 17351. Isabel Channel, Basilan Island, south of Zamboanga. September 11, 1909. Length 63 to 81 mm. 7 examples.
- Thirteen examples. Maagnas Bay, Lagonoy Gulf, Luzon. June 17, 1909. Length 40 to 60 mm.
23783. Machesi Island, eastern Palawan. April 5, 1909. Length 62 mm. Eight examples. Malcochin Harbor, Linapacan Harbor, Linapacan Strait. December 18, 1908. Length 24 to 29 mm.
- 14239, 23481. Mariveles wharf. January 30, 1909. Length 58 to 69 mm. (1106). Pearly, with reddish orange stripes across side about half wide as interspaces, which together with stripe less than pupil diameter. Blackish at caudal base. Lower head and chest with golden wash. Over all obscure specks of dusky or purplish, not showing markedly until colors faded. More or less distinct orange stripe across snout from eye to eye and corresponding golden blotch on hind portion of iris.
- 16496, 16497. Masamat Bay, Quinalasag Island. June 12, 1909. Length 43 mm.
- Four examples. Polloc, southern Mindanao. May 22, 1908. Length 48 to 63 mm.
- Two hundred ninety-one examples. Port Jamelo, Luzon. July 13, 1908. Length 22 to 72 mm.
23785. Port Palapag, east coast Luzon. June 2, 1909. Length 21 to 53 mm. 33 examples.
- Sixty-four examples. Port Palapag. June 3, 1909. Length 21 to 34 mm.
- Six examples. Port Uson, Mayanpayan Island. December 17, 1908. Length 60 to 65 mm. (874). Transparent silvery iridescent pink. Head with orange shades. Side with slightly backwardly curved bars, one through each tube of lateral line. Fins pink. Caudal dusky at extreme tip, with large diffuse dusky blotch at base.
- Fifteen examples. Rasa Island, Mantaquin Bay, Palawan Island. April 1, 1909. Length 24 to 70 mm. Male with buccal ova.
- Nine examples. Saboon Island, Ragay Gulf, Luzon. March 10, 1909. Length 34 to 68 mm. (1291.) Translucent pearly. Head and breast with orange tints. Sides with curved, transverse bars of bright orange, showing through middle of scale rows. Dorsal dusky pink, without bars. Caudal similar, dusky behind. Anal pink, with orange bar near base. Paired fins pink, pectorals with orange bar at base.
- Nine examples. San Roque, Leyte Island. January 29, 1909. Length 49 to 66 mm.
- 17114, 17978 to 17980. Simaluc Sibi Sibi Island, north of Tawi Tawi Group. September 23, 1909. Length 57 to 73 mm.
- Nine examples. Tataan Island, Tawi Tawi Group. February 21, 1908. Length 58 to 73 mm. (260.)
- 18910, 18911. Tulnalutan Island, east of Zamboagna. September 9, 1909. Length 63 to 66 mm.
- 23424, 24019 to 24021. Tutu Bay, Jolo Island, first anchorage. September 19, 1909. Length 68 to 78 mm. 17 examples.
- Two examples. Ulugan Bay, near Rita Island, Palawan. December 29, 1908. Length 42 to 47 mm.
23588. Tifu Bay, Bouro Island, Dutch East Indies. December 10, 1909. Length 48 to 73 mm. 12 examples.

- Four examples. Tomahu, vicinity Bouro Island. December 11, 1909. Length 49 to 65 mm.
- Fifty-nine examples. Tomahu. December 12, 1909. Length 31 to 70 mm. Male with buccal ova.
- 23965 to 23968. Limbe Strait, Celebes. November 11, 1909. Length 40 to 57 mm.
- 20668, 20669. Sadaa Island, Gulf of Tomini, Celebes. November 17, 1909. Length 64 to 66 mm.
- 18118, 18497. Tana Keke Island, Flores Sea. December 21, 1909. Length 34 to 76 mm. 7 examples.
- 23412, 23413. Gane Road, Gillolo Island. December 1, 1909. Length 71 to 75 mm. 5 examples.
- 23449, 23450. Doworra Island, Patiente Strait. December 2, 1909. Length 72 to 80 mm.
- Four examples. Labuan Blanda Island, Patiente Strait. December 14, 1909. Length 43 to 63 mm.
23797. Makyan Island. November 29, 1909. Length 72 mm.
- 8400 to 8407. Hokuho, Soo Wan, Formosa. January 29, 1910. Length 66 to 90 mm.
18420. Nan Wan, Formosa. January 25, 1910. Length 73 mm.

ARCHAMIA ZOSTEROPHORA (Bleeker)

- Apogon zosterophora* BLEEKER, Act. Soc. Sci. Ind. Néerland. (Manado), vol. 1, 1856, p. 36. Manado, Celebes.
- Apogon zosterophorus* GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 245 (copied).
- Amia zosterophora* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 103, pl. (35) 313, fig. 2 (Celebes).
- Archamia zosterophora* WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 236 (Tual, Low Key).—FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines); Proc. Acad. Nat. Sci. Philadelphia, 1918, p. 28, fig. 12; 1927, p. 274 (Philippine materials); Mem. Bishop Mus., vol. 10, 1928, p. 164, fig. 40 (compiled).

Depth $2\frac{1}{3}$ to $2\frac{3}{4}$; head $2\frac{1}{6}$ to $2\frac{1}{3}$, width $2\frac{1}{2}$ to 3. Snout $4\frac{3}{4}$ to 5 in head from upper jaw tip; eye 3 to $3\frac{1}{5}$, much greater than snout or interorbital; maxillary $\frac{1}{2}$ to $\frac{3}{5}$ in eye, expansion 2, length $1\frac{7}{8}$ to 2; teeth minute, villiform, in narrow bands in jaws and few on vomer and palatines; interorbital 4 to $4\frac{1}{2}$, slightly convex; preopercle ridge entire, edge finely minute. Gill rakers 4+15, lanceolate, slender, twice gill filaments or 2 in eye.

Scales 22 to 24 in lateral line to caudal base and 3 or 4 more on latter; 2 above, 6 below, 5 predorsal; 2 rows of cheek scales; muzzle including interorbital, suborbitals and maxillary naked. Tubes in lateral line well exposed, each with small basal scale. Scales with 7 to 9 basal radiating striae; sometimes with 22 weak apical denticles; circuli fine.

D. VI-I, 9, 1, third spine $2\frac{3}{5}$ to $2\frac{3}{4}$ in total head length, first ray $1\frac{2}{5}$ to $1\frac{1}{2}$; A. II, 15, 1, or 16, 1, second spine $2\frac{1}{6}$ to 3, first ray $1\frac{2}{5}$ to $1\frac{3}{4}$; caudal $1\frac{1}{8}$ to $1\frac{1}{4}$, moderately emarginate behind; least depth of caudal peduncle $2\frac{3}{5}$ to $2\frac{3}{4}$; pectoral $1\frac{1}{2}$ to $1\frac{2}{5}$; ventral 2 to $2\frac{1}{8}$.

Light or pale brown generally, sides and below little paler and silvery reflections on side of head and abdomen. Blackish brown band, narrower than pupil, from snout tip to eye. Cheek and sometimes opercle or edge of gill opening with obscure dusky dots. Broad blackish brown body band transversely and inclined little forward from all or greater part of soft dorsal base to postventral region, often reflected on dorsal and sometimes variously invading front of anal. Small blackish median basal caudal spot, less than half of eye. Iris silvery white.

East Indies, Philippines. A very handsome small species and very strongly contrasted in color pattern. This shows but little variation, though in preserved examples is often quite pale. Specimens from Manila Bay and vicinity and some from Mantaquin Bay, Palawan, lack the cross bands in alcohol and have the caudal spot very small. They also have a slightly smaller eye and slenderer caudal peduncle.

23801. Below mouth of Mindanao River, Cotabato, Mindanao. May 20, 1908. 3 examples. Length 45 to 55 mm.

Twelve examples. Biri Channel, southern Biri Island. June 2, 1909. Length 52 to 60 mm.

Two hundred and eight examples. Bolalo Bay, Palawan Island. December 21, 1908. Length 28 to 51 mm.

292, 293, 294, 7090. Busin Harbor, Burias Island. March 8, 1909. 15 examples. Length 51 to 61 mm.

14252. Candaraman Island, Balabac. January 4, 1909. Length 58 mm.

One example. Cannahala Bay, Luzon. March 11, 1909. Length 58 mm.

Twenty-one examples. Endeavor Strait, north-west coast of Palawan. December 22, 1908. Length 50 to 58 mm.

24072, 24073. Endeavor Strait. December 23, 1908. 3 examples. Length 49 to 56 mm.

14110. Endeavor Strait. December 24, 1908. Length 48 mm.

Eight examples. Isabel Channel, Basilan Island. September 11, 1909. Length 52 to 58 mm.

(D. 5360). Limbones Cove, Manila Bay, Luzon. February 8, 1909. Length 47 mm.

15802, 15803, 15804, 23392, 23784, 23791. Makesi Island, Palawan. April 5, 1909. Length 55 to 60 mm.

One example. Manila Harbor. January 1, 1908. Length 48 mm.

Thirty-two examples. Mantacao Island west of Bohol Island. April 8, 1908. Length 28 to 59 mm.

Twelve examples. Mantaquin Bay, Palawan Island. April 2, 1909. Length 40 to 46 mm.

One example. Oyster Inlet, Ulugan Bay, Palawan Island. December 28, 1908. Length 47 mm.

19956. Port Galera, Mindoro. October 27, 1909. Length 57 mm.

Forty-nine examples. Port Matalvi, Luzon. November 23, 1908. Length 44 to 58 mm.

23787, 23788, 23792, 23793. Port Palapag, east coast of Luzon. June 3, 1909. Length 57 to 63 mm.

Thirty-three examples. Port Uson, west of Pinas Island. December 17, 1908. Length 50 to 59 mm. (924). Translucent silvery gray, slightly dusky above

and purplish iridescence above anal. Black stripe across snout from front of eyes. Orange brown bar under hind limb or preopercle and across hinder edge of opercle. Throat and ventral surface more or less orange brown. Black bar from second dorsal obliquely forward to belly. Fins pink. Small black blotch at caudal base.

Two examples. Puerta Princesa Island, eastern Palawan. April 5, 1909.

Length 50 to 53 mm.

17490. Refugio Island, Pasacao, Luzon. March 9, 1909. Length 51 mm.

23659 to 23673. Rapurapu Island. January 22, 1909 (23671 with buccal eggs).

Length 39 to 68 mm. 35 examples.

Eleven examples. Romblon Harbor. March 25, 1909. Length 47 to 56 mm.

Four examples. Romblon Harbor. March 26, 1909. Length 57 or 58 mm.

Four examples. Rasa Island, Mantaquin Bay, Palawan. April 1, 1909. Length

32 to 43 mm.

8068. Sacol Island, east of Zamboanga. September 9, 1909. Length 57 mm.

Eleven examples. Sangley Point, Cavite, Luzon. March 23, 1908. Length 50 to 54 mm.

8292 to 8295. San Miguel Island, Tabaco Bay. June 4, 1909. Length 52 to 59 mm.

23802. Santa Cruz Island, Marinduque. April 24, 1908. Length 50 to 56 mm.

Twelve examples. Tataan, Simaluc Island. February 19, 1908. Length 58 to 64 mm. (158). Pearly gray. Broad black bar from soft dorsal across to vent, broken by numerous light nuclei. Two narrow orange brown bars across back of head, one near hinder opercle edge and one near hinder preopercle edge. Breast colored similarly to black area of sides. Branchiostegal margin orange brown. Dark umber brown stripe before eye across snout to opposite eye. Lower jaw tip dusky. Spinous dorsal pale dusky orange. Soft dorsal with pinkish shades, blackish at base. Caudal pink, narrowly tipped with black. Small black spot on caudal peduncle at base. Anal pink. Ventral light reddish brown, base marked by bar of same color.

24082. Tataan Island, Tawi Tawi Group. February 21, 1908. 11 examples.

Length 54 to 68 mm.

Twenty-one examples. Tutu Bay, Jolo Island, first anchorage. September 19, 1909. Length 56 to 66 mm.

Twenty-eight examples. Ulugan Bay, Palawan Island. December 28, 1908.

Length 40 to 52 mm.

One example. Ulugan Bay, near Rita Island. December 29, 1908. Length 48 mm.

23794, 23795. Bumbum Island, vicinity Darvel Bay, Borneo. September 25, 1909. Length 48 to 56 mm. 6 examples.

15869. Danawan and Si Amil Islands, vicinity Darvel Bay, Borneo. September 26, 1909. Length 48 to 67 mm.

13297, 23803, 24051. Gomomo Island, Pitt Passage. December 3, 1909. Length 38 to 59 mm. 11 examples.

23590 to 23592. Tifu Bay, Bouro Island. December 10, 1909. 9 examples. Length 60 to 66 mm.

23857, 23858. Togian Bay, Togian Island, Gulf of Tomini, Celebes. November 19, 1909. 3 examples. Length 38 to 58 mm.

23937, 24063 to 24065. Talisse Island, north of Celebes. November 9, 1909. Length 57 to 67 mm.

Twenty examples. Gane Road, Gillolo Island. December 1, 1909. Length 59 to 68 mm.

IOAMIA,⁷ new subgenus

Type.—*Apogonichthys gracilis* BLEEKER.

Diagnosis.—Body slender, depth 3 to $3\frac{2}{5}$. Dark median longitudinal band on side of body.

ARCHAMIA GRACILIS (Bleeker)

Apogonichthys gracilis BLEEKER, Nat. Tijds. Nederland. Indie, vol. 10, 1856, p. 371. Ternate.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 246 (copied).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 152 (Sarangoon, Singapore).

Amia gracilis BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 102 (Ternate); vol. 8, 1877-78, pl. (65) 343, fig. 2.

Apogonichthys nudus REGAN, Journ. Bombay Soc. Nat. Hist., vol. 16, 1905, p. 321, pl. 3, fig. 6. Karachi.

Apogonichthys mentalis EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 74, fig. 10. Bacon, Sorsogon.

Depth 3 to $3\frac{2}{5}$; head $2\frac{4}{5}$ to $3\frac{1}{5}$, width $2\frac{1}{3}$ to $2\frac{2}{5}$. Snout $4\frac{1}{8}$ to $4\frac{1}{3}$ in head from snout tip; eye $3\frac{1}{4}$ to $3\frac{3}{4}$, greater than snout or interorbital; maxillary reaches $\frac{1}{4}$ to $\frac{1}{5}$ in eye, expansion $2\frac{3}{4}$ to 3, length $2\frac{3}{5}$ to $2\frac{2}{3}$ in head; teeth villiform, in bands in jaws and few weak ones on vomer and palatines indistinctly visible and feeble; interorbital 4 to $4\frac{1}{5}$, very slightly convex; peropercle ridge and edge entire. Gill rakers 9 + 20, finely lanceolate, twice gill filaments or $\frac{1}{2}$ of eye.

Scales 22 in lateral line to caudal base and 4 more on latter; 2 above, 6 below, 5 predorsal, 2 rows on cheek; head naked, except cheeks and opercles, venulose over suborbitals. Lateral line of rather slender tubes, well exposed. Scales with 4 or 5 basal radiating striae; 24 to 43 weak short apical denticles; circuli moderate.

D. VI-I, 9, 1, third spine $2\frac{1}{4}$ to $2\frac{4}{5}$ in total head length, first ray $1\frac{3}{4}$ to $1\frac{4}{5}$; A. II, 12, 1, second spine $3\frac{3}{4}$ to $3\frac{4}{5}$, second ray $2\frac{1}{5}$ to $2\frac{1}{3}$; caudal $1\frac{1}{8}$ to $1\frac{1}{5}$, well forked, lobes slender and pointed; least depth of caudal peduncle $2\frac{7}{8}$ to $3\frac{1}{5}$; pectoral $1\frac{1}{6}$ to $1\frac{1}{5}$; ventral 2 to $2\frac{1}{8}$.

Pale brown generally, with silvery white reflections, especially about head and chest where also pale blue to violet or lilac tints. At snout above brown band given off each side over eye. Broad brown band along side of snout, through eye. On postocular pale or whitish horizontal band back over shoulder but not passing beyond first dorsal, margined with brown above and below which often with dark or small blackish spot in each behind level of pectoral origin in vertical. Fins all pale brownish.

Karachi, East Indies, Philippines.

(D. 5360). Limbones Cove, Manila Bay. In 12 fathoms. February 8, 1909. Length 37 to 62 mm. 8 examples.

⁷If δ s, arrow, with reference to the narrow or slender body; *Amia*.

23326. Simaluc Island, north of Tawi Tawi. September 22, 1909. Length 42 mm.

24018. Tutu Bay, Jolo Island. September 19, 1909. Length 54 mm.

One example. Tomahu Island, vicinity Bouro Island. December 11, 1909. Length 32 mm. "

Genus HYNNODUS Gilbert

Hynnodus GILBERT, Bull. U. S. Fish Comm., vol. 23, pt. 2, 1903 (1905), p. 617. Type *Hynnodus atherinoides* GILBERT, monotypic.

Scepterias JORDAN and JORDAN, Mem. Carnegie Mus., vol. 10, No. 1, December, 1922, p. 44. Type *Scepterias fragilis* JORDAN and JORDAN, orthotypic.

Parahynnodus BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 525. Type *Parahynnodus robustus* BARNARD, monotypic.

Body very elongate, slender. Caudal peduncle long. Head large, robust, wider than deep. Eyes very large, over $\frac{1}{3}$ of head. Mouth terminal. Minute teeth in jaws, subequal on vomer and palatines. Opercle with single spine. Pseudobranchiae very large. Gills 4, slit behind fourth arch. Gill rakers 14 to 16 on lower branch of first arch. Branchiostegals, 7. Scales 48 or 49 in lateral line to caudal base, very deciduous. Tubes in lateral line enlarged, each scale perforated by canal opening on outer surface beneath an antero-posterior bridge, on dorsal and ventral side of which wide external pores. Two wide set low dorsals, first of 6 or 7 spines, second of spine and 10 rays. Anal with 2 spines and 7 to 9 rays. Caudal forked.

We find nothing in the account of *Scepterias* to distinguish it from *Hynnodus* and its genotype was smaller (116 mm.) than most of our materials. *Parahynnodus* is certainly very close to this genus and we think probably synonymous. It is said to differ in the absence of teeth and the pores of the lateral line simple, hardly characters for generic distinction.

HYNNODUS ATHERINOIDES Gilbert

Hynnodus atherinoides GILBERT, Bull. U. S. Fish Comm., vol. 23, pt. 2, 1903 (1905), p. 618, pl. 79. Pailolo Channel, Hawaii, in 284 to 290 fathoms.—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 165 (Lahaina, Maui).

Hynnodus megalops SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 445, pl. 38, fig. 3. Between Burias and Luzon and north Mindanao, Philippines (N. Lat. $12^{\circ} 51' 30''$, E. Long. $123^{\circ} 26' 15''$, in 226 fathoms).

Scepterias fragilis JORDAN and JORDAN, Mem. Carnegie Mus., vol. 10, No. 1, December, 1922, p. 45, pl. 2, fig. 2. Honolulu.

Depth $5\frac{1}{2}$ to $6\frac{1}{4}$; head $2\frac{7}{8}$ to $2\frac{9}{10}$, width $1\frac{3}{4}$ to $1\frac{7}{8}$. Snout $4\frac{1}{4}$ to $4\frac{2}{5}$ in head from snout tip; eye $2\frac{3}{4}$ to $2\frac{4}{5}$, orbital socket $2\frac{1}{6}$ to $2\frac{1}{4}$, eye more than twice snout, about twice bony interorbital and much greater than space as seen between orbital sockets from head below; maxillary extends opposite first, fourth, or fifth of orbital socket, narrow, length $2\frac{3}{5}$ in head; very narrow band of minute simple curved teeth in each jaw, also similar teeth in single row on

vomer and each palatine; interorbital (bony) $4\frac{4}{5}$ to $5\frac{1}{3}$, concave; opercular spine slender, projects beyond gill opening; preopercle ridge entire. Gill rakers 7+17, lanceolate, equal gill filaments or 3 in orbital socket.

Scales 48 or 49 in lateral line to caudal base and 5 to 8 more on latter; 4 above, 7 below, 7 or 8 predorsal to occiput and 22 to end of snout; row of scales along very narrow cheek below eye. Tubes in lateral line slender, each bifid and diverge. Most fins more or less scaly, at least basally, except spinous dorsal, caudal largely covered. Scales with 12 to 15 basal radiating striae; 49 to 70 apical denticles, in 5 to 7 transverse series; circuli fine.

D. VII-I, 10, 1, third spine 2 to $2\frac{1}{3}$ in total head length, first branched ray $1\frac{1}{5}$ to $2\frac{1}{3}$; A. II, 9, 1, second spine 5 to 6, first branched ray $2\frac{1}{5}$ to $2\frac{2}{5}$; caudal $1\frac{1}{5}$ to $1\frac{2}{3}$, forked, lobes pointed; least depth of caudal peduncle $3\frac{1}{8}$ to 4; pectoral $2\frac{1}{5}$ to $2\frac{2}{3}$; ventral $1\frac{7}{8}$ to $2\frac{2}{5}$.

Body generally brown, scales all more or less sprinkled with deep sepia brown or dusky dots, mostly marginal. Head and fins all more or less with dusky so whole appearance soiled or dark. Iris and inside gill opening dusky to blackish. Gill covers with dusky silvery or neutral tints, blue tinge on opercle.

Philippines, Hawaii. We have compared the type with the materials of Smith and Radcliffe of their *Hynnodus megalops* and are unable to separate them. Their contention that Gilbert's fish "is slenderer, has a shorter head, snout and maxillary, and a slenderer caudal peduncle" are simply minor discrepancies of portraiture and should never have been credited as specific distinctions! There are absolutely no grounds for separating the Philippine fish. In some respects Gilbert's figure has been incorrectly idealized as the broken rays, compared with Philippine examples, show they are in agreement.

(D. 5388). 3778 to 3780. Bagatao Island Light (outer) S. 86° E., 21 miles ($12^{\circ} 51' 30''$ N., $123^{\circ} 26' 15''$ E.). March 11, 1909. Length 130 to 156 mm. (No. 3779 is type of *Hynnodus megalops* Smith and Radcliffe, No. 70255, U.S.N.M., 156 mm.).

(D. 5508). 2364. Camp Overton Light, Iligan Bay, S. 6° E., 4.9 miles, northern Mindanao ($8^{\circ} 17' 24''$ N., $124^{\circ} 11' 42''$ E.). August 5, 1909. Length 105 mm.

51601 U.S.N.M. Hawaii. Albatross Collection. Type of *Hynnodus atherinoides* Gilbert. Length 113 mm.

Genus CHEILODIPTERUS Lacépède

Cheilodipterus LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1802, p. 539. Type *Cheilodipterus lineatus* LACÉPÈDE, designated by JORDAN and EVERMANN, Genera of Fishes, pt. 1, 1917, p. 63.

Chilodipterus GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 248. Type *Cheilodipterus lineatus* LACÉPÈDE.

Paramia BLEEKER, Nederland. Tijdschr. Dierk., vol. 1, 1863, p. 233. Type *Cheilodipterus lineatus* LACÉPÈDE. *Paramia* BLEEKER proposed to replace *Cheilodipterus* LACÉPÈDE.

Body moderately elongate. Eye large. Teeth in villiform bands in jaws, on vomer and palatines, usually some in both jaws enlarged canines. Opercle without spine. Preopercle ridge entire or serrate, edge serrate. Gill rakers 12 to 15 on lower branch of first arch. Branchiostegals 7. Scales large, deciduous, 22 to 24 in lateral line to caudal base. Head scaly. Two separated dorsals, first with 6 spines, second with spine and 8 to 10 rays. Anal with 2 spines and 8 or 9 rays. Caudal emarginate or forked. Coloration usually with dark longitudinal stripes.

Small tropical fishes, differing from *Amia* chiefly in the presence of canine teeth in the jaws.

ANALYSIS OF THE SPECIES

- a*¹. DESMOAMIA new subgenus. Single, median, dark, lateral band and paler parallel band along back; caudal without median dark or black basal spot. zonatus
- a*². CHEILODIPTERUS. Four to 9 or more dark longitudinal bands; usually dark, round, basal caudal spot.
- b*¹. Four black longitudinal bands, slightly narrower than pale interspaces. nigrotaeniatus
- b*². Five dark or black longitudinal bands.
- c*¹. Dark longitudinal bands not extending on head and whole coloration without bands contrasted..... singaporensis
- c*². Dark lateral bands extending on head and greatly contrasted. quinquelineatus
- b*³. Seven to 9 dark brown longitudinal bands, slightly narrower than pale interspaces, each of which may have a dark intermediate parallel line, with bands thus increased to 17..... lineatus

DESMOAMIA,⁸ new subgenus

Type.—*Cheilodipterus zonatus* SMITH and RADCLIFFE.

Diagnosis.—Single, median dark lateral band and paler parallel band along back. Caudal without black median basal spot.

CHEILODIPTERUS ZONATUS Smith and Radcliffe

Cheilodipterus zonatus SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 443, pl. 38, fig. 1. South Rita and Endeavor Strait, Palawan.

Depth 4 to $4\frac{1}{3}$; head $2\frac{3}{5}$ to $2\frac{1}{5}$, width $2\frac{1}{5}$ to $2\frac{1}{3}$. Snout $4\frac{1}{8}$ to $4\frac{2}{5}$ in head from snout tip; eye $3\frac{2}{5}$ to $3\frac{1}{2}$, greater than snout or interorbital; maxillary reaches $\frac{7}{8}$ in eye, expansion 2 to $2\frac{1}{10}$ in eye, length $1\frac{9}{10}$ to 2; teeth in villiform bands in jaws, on vomer and palatines and outer series of about 8 anteriorly above as slightly canine-like; small canine each side of mandible, another each side of vomer and row of outer enlarged mandibular laterals, posteriorly largest; interorbital 5, nearly level or only slightly depressed; preopercle ridge and edge entire. Gill rakers 5+15, lanceolate, equal gill filaments or $\frac{1}{4}$ in eye, also some as rudiments.

⁸ *δεσμος* band, with reference to the median dark lateral band; *Amia*.

Scales 24 in lateral line to caudal base and 2 or 3 more on latter; 2 above, 6 below, 6 predorsal, 2 rows on cheek; head scaly, except cheeks and opercles, upper surface venulose. Tubes in lateral line large, well exposed, with small basal scale to each tube but little exposed. Scales with 10 or 11 basal radiating striae; 50 to 52 apical denticles, with 5 transverse series of basal elements; circuli fine.

D. VI-I, 8, 1, second spine $2\frac{1}{8}$ to $2\frac{1}{3}$ in total head length, first ray 2 to $2\frac{1}{5}$; A. II, 8, 1, second spine $4\frac{3}{5}$?, first ray $2\frac{1}{8}$ to $2\frac{1}{5}$; caudal $1\frac{1}{6}$?, emarginate behind; least depth of caudal peduncle $2\frac{7}{8}$ to $3\frac{1}{10}$; pectoral $2\frac{1}{10}$ to $2\frac{2}{5}$; ventral $1\frac{3}{4}$ to 2.

Back rich brown leaving pale dorsal line along upper edge of back from interorbital to soft dorsal. Well defined median blackish brown band from snout through eye and back to caudal base medianly though little low along side of caudal peduncle, ending in point at caudal base. Iris, except as crossed by dark band, silvery white. Fins all pale uniform brownish. Upper and lower edges of caudal narrowly darker brown than rest of fin.

Only known from the type and paratype listed below.

982. Ulugan Bay, Rita Island, Palawan. December 29, 1908. Length 65 mm. (Type No. 70253 U.S.N.M.)

968. Endeavor Strait, northwest coast of Palawan. December 22, 1908. Length 60 mm. Dusky appearance on body given by numerous fine dark dots on scales. Upper lip over premaxillaries violet. Blackish line from snout through eye across opercle and along side of tail; on side below blackish line narrow and metallic light green line half as wide. Region on body below these two lines and chin dusky yellow, on opercle and on iris under pupil bright yellow. Blackish line, narrower and fainter than median lateral dark line, extends along back on each side of dorsal fins from snout to tail. Obsolete similar line medially from nape to second dorsal. On nape, between dark lines, spaces decided lavender metallic green and same spaces between nape and first dorsal, purplish metallic. Two dorsal lines converge before eyes and become deep violet, remainder of snout dusky with wash of yellow. Region between prominent dark line along side and first dorsal line (above) light metallic green, becoming metallic violet on upper part of opercle. First dorsal and ventrals washed with yellow, other fins dusky hyaline.

Subgenus CHEILODIPTERUS Lacépède

Four to nine or more dark longitudinal bands. Usually dark, round, basal caudal spot present.

CHEILODIPTERUS NIGROTAENIATUS Smith and Radcliffe

Cheilodipterus nigrotaeniatus SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 442, pl. 37, fig. 3. Northeast Sacol Island, Philippines.

Depth 3 to $3\frac{3}{4}$; head $2\frac{1}{2}$ to $2\frac{3}{5}$, width $2\frac{2}{5}$. Snout $3\frac{7}{8}$ to 4 in head; eye $3\frac{1}{2}$, greater than snout or interorbital; maxillary reaches opposite hind pupil edge, expansion 2 in eye, length 2 in head; teeth in villiform bands in jaws, on vomer and palatines and row of irregular enlarged outer teeth in jaws; interorbital $5\frac{1}{4}$ to $5\frac{3}{5}$, level; preopercle

ridge and edge entire. Gill rakers 4 + 14, finely spinescent, lanceolate, equal gill filaments or $3\frac{1}{2}$ in eye.

Scales 24 in lateral line to caudal base and 2 more on latter; 2 above, 6 below, 7 predorsal, 2 or 3 rows on cheek; head venulose on inter-orbital and cranium and naked, except on cheeks and opercles. Lateral line of simple tubes well exposed and each with small basal scale. Scales with 15 or 16 basal radiating striae; 56 to 70 apical denticles, in 3 or 4 transverse series; circuli fine.

D. VI-I, 9, 1, third spine $2\frac{2}{5}$ to $2\frac{3}{5}$ in head, first ray $1\frac{7}{8}$ to 2; A. II, 8, 1, second spine $3\frac{3}{5}$ to $3\frac{3}{4}$, first ray 2 to $2\frac{1}{5}$; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, emarginate behind; least depth of caudal peduncle $2\frac{7}{8}$ to 3; pectoral $2\frac{1}{4}$; ventral $1\frac{7}{8}$ to 2.

General color whitish. Blackish brown band begins at occiput, divides and extends along each side close along dorsal bases to unite behind soft dorsal, then extends to caudal. Second dark band begins over eye and extends to base of upper caudal lobe. Third dark band runs along side of snout through eye and back over median axis of body to caudal base medianly. Fourth dark band from lower anterior face of mandible, over infraorbital back to pectoral base and then back to middle of lower caudal lobe. Caudal base with a few irregular blackish spots of small size. Fins otherwise all pale to whitish.

Philippines and East Indies. Only known from the materials listed here.

15773 (S. 1916). Sacol Island, east of Zamboanga. September 9, 1909. Length 80 mm. (Type No. 70252, U.S.N.M.) Dusky median dorsal stripe, probably black in life; dusky stripe across snout continued behind eye as median lateral jet black stripe; branch over eye runs above lateral line to caudal peduncle as black stripe; third black lateral stripe crosses chin and runs backward under eye and through base of pectoral to bases of lower caudal rays; intervals between dark stripes and lower surface of body clouded white; on head intervals bright yellow and area behind eye running back far as second dorsal with yellow. Spinous dorsal hyaline. Soft dorsal slightly dusky in front. Caudal dusky, stripes of sides broken into dots at base of fin. Other fins dusky or hyaline.

8071. Sacol Island. September 9, 1909. Length 77 mm.

21410. Tutu Bay, Jolo Island, first anchorage. September 19, 1909. Length 77 mm.

One specimen. Gomomo Island, Pitt Passage. December 3, 1909. Length 75 mm.

CHEILODIPTERUS SINGAPORENSIS Bleeker

Cheilodipterus singaporensis (CASTELNAU) BLEEKER, Nat. Tijds. Nederland. Indië, vol. 20, 1859-60, p. 452. Singapore.—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 153 (Singapore).—BEAUFORT, Bijd. Dierk., Amsterdam, 1913, p. 116 (Beo, Majalibit Bay, Waigiu).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 165 (compiled).

Paramia singaporensis BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 106, pl. (35) 313, fig. 4 (Singapore).

Depth $3\frac{2}{5}$ to $3\frac{1}{2}$; head $2\frac{1}{2}$ to $2\frac{2}{3}$, width $2\frac{2}{3}$ to $2\frac{4}{5}$. Snout $3\frac{1}{2}$ to 4 in head from upper jaw tip; eye $3\frac{3}{4}$ to 4, greater than snout or interorbital though subequal with snout with age; maxillary to hind pupil edge in young, to hind eye edge with age, expansion $1\frac{4}{5}$ to 2 in eye, length $1\frac{2}{5}$ to $1\frac{7}{8}$ in head; anteriorly above 6 canines and as many smaller conic teeth, below 4 large front canines and 3 lateral each side; posteriorly in upper jaw and on vomer and each palatine band of villiform teeth; interorbital $5\frac{1}{2}$ to 6, level; preopercle ridge and edge entire, latter finely serrate in young. Gill rakers 1+7, also with 2 rudiments above and 5 or 6 below; length $\frac{3}{4}$ of gill filaments or $3\frac{2}{3}$ in eye.

Scales 22 or 23 in lateral line to caudal base and 2 or 3 more on latter; 2 above, 7 below, 7 predorsal, 3 or 4 rows of scales on cheek to preopercle ridge. Scales with 15 to 27 basal radiating striae; 81 to 116 apical denticles, with 3 to 6 transverse series of basal elements; circuli fine.

D. VI-I, 9, I, third spine $2\frac{1}{3}$ to $2\frac{2}{3}$ in total head length, first ray $1\frac{2}{3}$ to $1\frac{4}{5}$; A. II, 8, I, second spine $2\frac{3}{4}$ to 3, first ray $1\frac{3}{5}$ to 2; caudal $1\frac{1}{3}$ to $1\frac{2}{3}$, hind edge slightly emarginate with lobes rounded; least depth of caudal peduncle $2\frac{1}{2}$ to $2\frac{4}{5}$; pectoral $1\frac{4}{5}$ to 2; ventral $1\frac{7}{8}$ to 2.

Brown on back and above, little paler below. Traces of five diffuse dark brown longitudinal bands, not well defined and more obscure in large examples. Small examples with small obscure dusky neutral blotch, less than pupil, at middle of caudal base. Also many examples with still more contrasted blotch of blackish surrounding vent. Fins brownish, more or less clouded with deeper or dusky and spinous dorsal usually quite dark terminally. Ventrals darker terminally. Iris brownish.

Singapore, East Indies, Philippines. Easily known by its subdued coloration and the dark longitudinal bands not extending on the head.

9293, 11274, 16364. Biri Channel, east coast of Luzon. June 1, 1909. Length 117 to 180 mm.

9941. Biri Channel. June 2, 1909. Length 139 mm.

16868. Bisucay Island, Cuyos Islands. April 9, 1909. Length 182 mm.

23042, 23043. Bolalo Bay, Palawan Island. December 21, 1908. Length 156 to 165 mm.

15028, 16770 to 16774. Busin Harbor, Burias Island. March 7, 1909. Length 66 to 167 mm.

172. Busin Harbor. March 8, 1909. Length 158 mm.

7483. Busin Harbor. April 22, 1909. Length 196 mm.

14241, 14245, 14246. Candaraman Island, Balabac. January 4, 1909. Length 128 to 151 mm.

23986. Cataingan Bay, Masbate Island. April 18, 1908. Length 85 mm.

16316, 23381, 23382. Endeavor Strait, northwest coast of Palawan. December 23, 1903. Length 88 to 117 mm.

6803. Gigoso Point, Quinapundan Bay, Samar Island. July 28, 1909. Length 105 mm.

15205. Mactan Island, Cebu. March 25, 1909. Length 141 mm.
 23039 to 23041. Makesi Island, Palawan. April 5, 1909. Length 150 to 161 mm.
 23635, 23636, 23638, 23639. Murcielagos Bay, Mindanao Island. August 21, 1909. Length 49 to 128 mm. 5 examples.
 10655. Polloc, Mindanao Island. May 22, 1908. Length 141 mm.
 15477, 15478, 17165. Port Matalvi, Luzon. November 23, 1908. Length 137 to 156 mm.
 23263. Port Palapag, eastern Luzon. June 3, 1909. Length 108 mm.
 5550. Rasa Island, Mantaquin Bay, Palawan Island. April 1, 1909. Length 193 mm.
 23070. Romblon Harbor, Romblon. March 25, 1908. Length 99 mm.
 7015. Romblon. March 26, 1908. Length 184 mm.
 15769 to 15772. Sacol Island, east of Zamboanga Island. September 9, 1909. Length 83 to 142 mm.
 17786. San Miguel Island, Tabaco Bay, Mindoro Island. June 4, 1909. Length 170 mm.
 12228, 14175. Santa Cruz Island, Marinduque. April 24, 1908. Length 96 to 127 mm.
 24062. Shore above Iloilo River, Panay. June 2, 1908. Length 48 mm.
 19017. Tapiantana Island, south of Zamboanga. September 13, 1909. Length 160 mm.
 23034. Tataan, Simaluc Island. February 20, 1908. Length 141 mm.
 8043 (341). Tumindao Island, Sulu Archipelago. February 26, 1908. Length 131 mm.
 23072. Tumindao Reef, south end. February 26, 1908. Length 54 mm.
 7921, 7923, 11688, 23048. Tutu Bay, first anchorage, Jolo Island. September 19, 1909. Length 71 to 138 mm.
 16087, 16088, 16089, 24113. Ulugan Bay, Oyster Inlet, Palawan. December 28, 1908. Length 46 to 108 mm.
 240. Ulugan Bay, Palawan Island. December 29, 1908. Length 106 mm.
 14519, 15438, 15440. Ulugan Bay, Rita Island. December 29, 1908. Length 77 to 148 mm.
 17856. Bumbum Island, vicinity of Darvel Bay, Borneo. September 25, 1909. Length 145 mm.
 23044, 23045, 23760. Daisy Island, west of Bumbum Island. January 6, 1910. Length 67 to 125 mm.
 15833. Reef northwest Tumindao, vicinity of Darvel Bay. September 24, 1909. Length 125 mm.
 14873, 23393. Dodepo and Pasejogo Islands, Gulf of Tomini, Celebes. November 16, 1909. Length 123 to 135 mm.
 13093. Kapoposang Island, Celebes. December 28, 1909. Length 146 mm.
 20666. Sadaa Island, Celebes. November 17, 1909. Length 131 mm.
 9705, 14397, 14937, 22736, 23551 to 23554. Talisse Island, North of Celebes. November 9, 1909. Length 52 to 144 mm.
 23852, 23853, 23922. Togian Bay, Togian Island, Gulf of Tomini, Celebes. November 19, 1909. Length 96 to 122 mm.
 21474. Dowarra Island. December 2, 1909. Length 112 mm.
 13055. Gomomo Island. December 3, 1909. Length 128 mm.
 23051. Tomahu Island. December 11, 1909. Length 62 mm.

CHEILODIPTERUS QUINQUELINEATUS Cuvier

Cheilodipterus quinquelineatus CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 167. Society Islands.—LESSON, Voy. Coquille, Zool., vol. 2, pt. 1, 1830, p. 237 (Borabora, Society Islands).—RÜPPELL, Neue Wirbelth., Fische, 1835, p.

- 89 (Red Sea).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 716 (Koseir, Red Sea).—DAY, Proc. Zool. Soc. London, 1870, p. 682 (Andamans); Fishes of India, pt. 1, 1875, p. 66.—CASTELNAU, Res. Fish. Austral. (Victoria Off. Rec. Philadelphia Exhib.), 1875, p. 9 (Cape York, Queensland).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 13 (Cebu; Rubi, New Guinea).—THURSTON, Notes Pearl Fisher. Manaar, 1890, p. 91 (Pamban).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 239 (Biaru Island; Saleyer).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 274 (Phillipines); Mem. Bishop Mus., vol. 10, 1928, p. 165 (Nukuhiva, Raiatea, Faté, New Guinea, Papeete, Apia, Vavau).
- Chilodipterus quinquelineatus* GÜNTHER, Cat. Fishes Brit. Mus., vol. 1, 1859, p. 248 (Amboyna).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 22 (Zanzibar and Aden).—GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 23 (Society Islands; Taumotus).—KLUNZINGER, Fische Roth. Meer., 1884, p. 23.—STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, Math.-Nat. Kl., vol. 48, 1884, p. 4 (Kagoshima, Japan).—DAY, Fauna Brit. India, vol. 1, 1889, p. 502.—ELERA, Cat. Fauna Filip., 1895, p. 471 (Cebu).—REGAN, Journ. Linn. Soc. London, vol. 12, ser. 2, 1907, p. 224 (Diego Garcia, Chagos Archipelago).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 526 (Mozambique).
- Paramia quinquelineata* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 105, pl. (48) 326, fig. 2 (Sumatra, Nias, Batu, Singapore, Banka, Cocos, Java, Celebes, Sangir, Solor, Halmaheira, Ternate, Batjan, Amboina, Ceram).—JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 907 (copied).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 252 (Apia and Pago Pago).
- Apogon novemstriatus* RÜPPELL, Neue Wirbelth., Fische, 1835, p. 85, pl. 22, fig. 1. Massauah, Red Sea.
- Cheilodipterus popur* THIOLLIÈRE, Fauna Woodlark, 1857, p. 142. Woodlark Island.

Depth 3 to 4; head $2\frac{1}{3}$ to $2\frac{1}{2}$, width $2\frac{1}{8}$ to $2\frac{1}{2}$. Snout 4 to $4\frac{1}{5}$ in head from snout tip; eye $2\frac{4}{5}$ to $3\frac{1}{3}$, greater than snout or interorbital; maxillary reaches opposite $\frac{3}{5}$ to $\frac{2}{3}$ in eye, expansion 2 to $2\frac{1}{3}$ in eye, length $1\frac{7}{8}$ to 2 in head; bands of villiform teeth in jaws, on vomer and palatines, 2 moderate or small canines above anteriorly each side, and 3 or 4 small lower lateral canines; interorbital $4\frac{1}{5}$ to 6, nearly level; preopercle ridge entire, edge finely serrate. Gill rakers 1 + 9, also 5 or 6 rudiments above and below and equal gill filaments, which $2\frac{3}{4}$ in eye.

Scales 23 in lateral line to caudal base and 3 or 4 more on latter; 2 or 3 above, 6 below, 5 predorsal, 2 rows of scales on cheek to preopercle ridge; muzzle, including interorbital, suborbitals and maxillary, naked. Scales with 6 to 14 basal radiating striae; 23 to 83 apical denticles, either uniserial or with only 1 row of basal elements; circuli fine.

D. VI-I, 9, 1, third spine 2 to $2\frac{1}{4}$ in total head, first ray $1\frac{3}{5}$ to $1\frac{4}{5}$; A. II, 8, 1, second spine $2\frac{1}{3}$ to $2\frac{3}{5}$, first ray $1\frac{3}{5}$ to $2\frac{1}{8}$; caudal $1\frac{1}{6}$ to $1\frac{1}{4}$, deeply emarginate to forked; least depth of caudal peduncle $2\frac{7}{8}$ to 3; pectoral $1\frac{2}{3}$ to $2\frac{1}{8}$; ventral 2 to $2\frac{1}{6}$.

Largely dull warm brown, scarcely paler below and sides with silvery reflections. Five deep longitudinal deep brown sharply defined bands, also median one below from chest to anal; on head posteriorly and on trunk bands all more or less wider or expanded to about half diameter of pupil; at caudal base median lateral band broken to offset black spot at middle of caudal base, which little less than pupil. Iris whitish or silvered except as crossed by median dark lateral band. Fins all more or less pale or light brownish to whitish; front edge of spinous dorsal dark brown or dusky; upper and lower caudal edges narrowly bordered with dusky, variably rather pale. Very small examples without lowest dark lateral band and ventral median dark band not complete on chest; caudal spot also larger; lower teeth better developed than adult or with more canines.

Red Sea, Zanzibar, Mozambique, Seychelles, India, Andamans, East Indies, Philippines, Japan, Queensland, Melanesia, Polynesia.

24078. Alibijaban Island, Ragay Gulf. March 6, 1909. Length 60 mm.

9292, 23439. Biri Channel. June 1, 1909. Length 95 to 106 mm.

23467, 23765. Biri Channel. June 2, 1909. Length 71 to 82 mm. Male with buccal ova.

23060. Bolalo Bay, Palawan Island. December 21, 1908. 8 examples. Length 45 to 80 mm.

16777. Busin Harbor, Burias Island. March 7, 1909. Length 82 mm.

19443, 19444. Cagayan, Jolo. January 8, 1909. Length 71 to 76 mm.

14247, 14248. Candaraman Island, Balabac. January 4, 1909. Length 64 to 84 mm.

23093. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 65 mm.

15091, 15092, 15094, 15096, 15098. Capulaan Bay, Pagbilao, Chica Island. February 24, 1909. Length 41 to 75 mm.

12100. Capunuyugan Point, Generale Island, east coast, Mindanao. May 10, 1908. Length 63 mm.

15509. Caracaran, Batan Island. June 8, 1909. Length 95 mm.

13177, 24054. Cataingan Bay, Masbate Island. April 17, 1908. 6 examples. Length 68 to 98 mm.

23996 to 23998. Cataingan Bay. April 18, 1908. Length 48 to 67 mm.

16097. Cataingan Bay. May 14, 1909. Length 70 mm.

Twenty-nine examples. Catbalogan, Samar Island. April 16, 1908. Length 73 to 116 mm.

(1822?) Cebu market. August 28, 1909. Length 66 mm.

23077, 23496, 23497. Endeavor Strait, northwest coast of Palawan. December 22, 1908. Length 67 to 72 mm.

15742, 15744, 15745. Endeavor Strait. December 23, 1908. Length 47 to 85 mm.

23102, 23103. Galera Bay, Mindoro. June 9, 1908. Length 70 to 80 mm.

23518 to 23520. Guiniyan Island. June 4, 1909. Length 75 to 90 mm. Male with buccal ova.

9902. Inamucan Bay, Mindanao. August 8, 1909. Length 75 mm.

17341, 17345, 23947, 23948. Isabel, Basilan Island. September 11, 1909. Length 73 to 82 mm. Male with buccal ova.

23705. Jolo. March 6-7, 1908. Length 87 mm.
- 23918, 23919. Limbones Cove, Luzon Island. February 8, 1909. Length 65 to 74 mm. (1130). Pearl color. Stripes black, caudal spot in lemon yellow area about size of eye.
- One example. Mactan Island. August 31, 1909. Length 38 mm.
- 5738, 5739. Mahinog, Camiguin Island. August 3, 1909. Length 88 or 89 mm.
- 15801, 15010, 15011, 23078, 23079, 23391. Makesi Island, Palawan. April 5, 1909. 14 examples. Length 59 to 86 mm.
- Five examples. Mantacac Island, west coast of Bohol. April 8, 1908. Length 41 to 76 mm.
11228. Mantaquin Bay, eastern Palawan. April 2, 1909. Length 75 mm.
- Three specimens. Maribojoc Bay, Maribojoc, Bohol. March 26, 1909. Length 67 to 89 mm. Two males with buccal ova.
- 21971 to 21973. Murcielagos Bay, Mindanao. August 9, 1909. Length 74 to 79 mm.
23086. Near Palag Bay, Luzon. June 16, 1909. Length 66 mm.
- Three examples. Opol, Mindanao. August 4, 1909. Length 75 to 104 mm.
- 23834 to 23840. Pandanon Island. March 23, 1909. Length 55 to 79 mm.
- Male with buccal ova.
10537. Polloc, Mindanao. May 22, 1908. Length 90 mm.
- Two examples. Port Banalacan, Marinduque. February 23, 1909. Length 40 to 44 mm.
- 23058, 23059. Port Ciego, Balabac. January 3, 1909. Length 80 to 82 mm.
- One example. Port Galera, Mindoro. June 9, 1908. Length 31 mm.
- One example. Port Jamelo, Luzon. July 13, 1908. Length 46 mm.
65. Port Langan, Palawan Island. April 8, 1909. Length 77 mm.
- 14471, 23100, 23101. Port Palapag. June 2, 1909. Length 71 to 92 mm. Male with buccal ova.
- One example. Port Palapag. June 3, 1909. Length 74 mm. Male with buccal ova.
21003. Pujada Bay, Mindanao Island. May 15, 1908. Length 62 mm.
23558. Rapurapu Island. June 22, 1909. Length 44 mm.
- One example. Rasa Island, Mantaquin Bay, Palawan. April 1, 1909. Length 74 mm. Male with buccal ova.
- 23046, 23047, 23071, 23073. Reef south lagoon, Tumindao Island, Sulu Archipelago. February 26, 1908. Length 32 to 85 mm.
- 23097, 23098. Romblon. March 26, 1908. Length 67 to 75 mm.
- 23066 to 23069. Romblon Harbor. March 25, 1908. Length 53 to 69 mm.
- Male with buccal eggs.
- One example. Saboon Island, Ragay Bay, Ragay Gulf, Luzon. March 10, 1909. Length 43 mm.
- 14057, 15775. Sacol Island. September 9, 1909. Length 42 to 69 mm.
- 3 examples.
8279. San Miguel Island, Tabaco Bay, Luzon. June 4, 1909. Length 77 mm.
- Six examples. San Miguel Port, Ticao Island, between Burias and Luzon. April 21, 1908. Length 49 to 81 mm.
23982. Santa Cruz Island, Marinduque. April 24, 1908. Length 60 mm.
23085. Simulac Island, north of Tawi Tawi. September 22, 1909. Length 60 mm.
- 23053 to 23055, 23084. Surigao, Mindanao Island. May 8, 1908. Length 53 to 80 mm. Male with buccal ova.
24014. Tara Island. December 15, 1909. Length 49 mm.
23065. Tataan, Simaluc Island. February 19, 1908. Length 46 to 95 mm. 15 examples.

- Thirty-eight examples. Tataan. February 20, 1908. Length 55 to 92 mm. One example. Tataan Pass. February 21, 1908. Length 77 mm.
- 6146, 24057. Tonquil Island east of Gumila Reef. September 14, 1909. Length 43 to 93 mm. 6 examples.
15583. Tulayan Island, Jolo Island. September 15, 1909. Length 78 mm.
16585. Tulnalutan Island, east of Zamboanga. September 9, 1909. Length 74 mm.
8035. Tumindao Island, Sulu Archipelago. February 26, 1908. Length 75 mm. Male with buccal eggs.
23087. Tutu Bay, Jolo Island, first anchorage. September 19, 1909. Length 77 mm.
- One example. Usadea Island, vicinity of Jolo. March 3, 1908. Length 44 mm.
- 23755 to 23759. Daisy Island, west of Bumbum, Trusan Tando Bulong, British North Borneo. January 6, 1910. Length 60 to 83 mm.
23959. Danawan and Si Amil Islands, vicinity of Darvel Bay, Borneo. September 26, 1909. Length 78 mm.
23745. Danawan and Si Amil Islands. September 27, 1909. Length 66 mm. One example. Basa Reef, Gulf of Boni, Celebes, Dutch East Indies. December 17, 1909. Length 26 mm.
21125. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 78 mm.
- 9503, 23397. Dodepo and Pasejogo Islands, Gulf of Boni, Celebes. November 16, 1909. Length 53 to 67 mm.
24037. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 90 mm.
23981. Limbe Strait, Celebes. November 11, 1909. Length 66 mm.
23445. Dowarra Island, Gillolo. December 2, 1909. Length 83 mm.
23104. Powati Harbor, Makyan Island. November 28, 1909. Length 70 mm.
23694. 23695. Gomomo Island. December 3, 1909. Length 60 to 62 mm.
23938. Talisse Island, north of Celebes. November 9, 1909. Length 71 mm.
- 23532, 23877. Tidore Island, south of Ternate. November 25, 1909. Length 85 mm.

CHEILODIPTERUS LINEATUS (Linnaeus)

- Perca lineata* LINNAEUS, Syst. Nat., ed. 10, vol. 12, 1758, p. 293. Habitat?; ed. 12, 1766, p. 489.—FORSKÅL, Descript. Animal., 1777, p. 42.—BONNATERRE, Tabl. Ichth., 1788, p. 134.—GMELIN, Syst. Nat. Linn., vol. 1, 1789, p. 1319.—RÜPPELL, Neue Wirbelth., Fische, 1835, p. 89.
- Chilodipterus lineatus* GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 248 (Red Sea and Madagascar).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 21 (Zanzibar and Aden).—BOULENGER, Proc. Zool. Soc. London, 1887, p. 656 (Muscat).—DAY, Fauna Brit. India, vol. 1, 1889, p. 502, fig. 151.—ZUGMAYER, Abh. Bayer. Akad. Wiss., Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 10 (Mekran and Oman).
- Cheilodipterus lineatus* KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 717 (Koseir, Red Sea).—DAY, Fishes of India, pt. 1, 1875, p. 66, pl. 18, figs. 8-9 (Gwadar).—BORSIERI, Ann. Mus. Civ. Stor. Nat. Genova, vol. 41, 1904, p. 192 (Sciumma on Daalac Island).—BEAUFORT, Bijdr. Dierk., Amsterdam, 1913, p. 116 (Buton).—FOWLER, Copcia, No. 58, June 18, 1918, p. 63 (Philippines); Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 274 (Philippine material); Mem. Bishop Mus., vol. 10, 1928, p. 164 (New Guinea, Apia, Mangareva).
- Paramia lineata* BLEEKER, Nederl. Tijdschr. Dierk., vol. 1, 1863, p. 344 (Madagascar).
- Perca arabica* GMELIN, Syst. Nat. Linn., vol. 1, 1789, p. 1312 (on FORSKÅL).—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 85 (Arabia).

Centropomus arabicus LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 249, 257 (Arabia).

Cheilodipterus arabicus CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 165, pl. 23 (Lohaja).

Centropomus macrodon LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 252, 273. Mauritius and Reunion.

Paramia macrodon BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 105 (Batu, Singapore, Java, Bawean, Celebes, Batjan, Amboina).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 252 (Apia and Samoa).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 239 (Saleyer).

Chilodipterus macrodon KLUNZINGER, Fische Roth. Meer., 1884, p. 23.—DAY, Fauna Brit. India, vol. 1, 1889, p. 501.—ZUGMAYER, Abh. Bayer. Akad. Wiss., Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 10 (Oman).

Cheilodipterus macrodon McCULLOCH, Proc. Linn. Soc. New South Wales, vol. 46, No. 4, 1921, p. 469 (Palm Island, Queensland).

Cheilodipterus octovittatus CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 163. Mauritius.—GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 23.—PLAYFAIR, Fishes of Zanzibar, 1866, p. 21 (Zanzibar and Johanna).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 717 (Koseir, Red Sea).—PETERS, Monatsb. Akad. Wiss. Berlin, 1876, p. 436 (Mauritius).—MACLEAY, Proc. Linn. Soc. New South Wales, vol. 7, 1882, p. 236.

Cheilodipterus octovittatus GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 248 (Mauritius, Amboyna, India).—BOULENGER, Proc. Zool. Soc. London, 1887, p. 656 (Muscat).

Cheilodipterus heptazona BLEEKER, Verh. Batav. Genootsch. (Perc.), vol. 22, 1849, p. 29. Batavia, Java.

Paramia octolineata BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (27) 305, fig. 2.

Depth 3 to $3\frac{4}{5}$; head $2\frac{2}{5}$ to $2\frac{3}{5}$, width $2\frac{2}{5}$ to $2\frac{3}{5}$. Snout $3\frac{3}{5}$ to 4 in head from snout tip; eye 3 to $3\frac{1}{2}$, greater than snout in young and subequal with age, greater than interorbital at all ages; maxillary reaches $\frac{2}{3}$ to $\frac{4}{5}$ in eye, expansion $1\frac{1}{5}$ to $2\frac{1}{5}$ in eye, length $1\frac{7}{8}$ to 2 in head; 4 or 5 lower canines each side in lower jaw and 3 to 5 each side in upper, and narrow band or row of minute teeth on vomer and each palatine; interorbital $4\frac{1}{2}$ to 5, nearly level; preopercle ridge and edge entire in young, edge minutely serrate with age. Gill rakers 1 + 7, with 5 rudiments above and 7 below; length equals gill filaments or $2\frac{3}{4}$ in eye.

Scales 22 in lateral line to caudal base and 4 more on latter; 2 above, 5 or 6 below, 6 predorsal, 2 or 3 rows of scales on cheek to preopercle ridge; muzzle, including interorbital, suborbitals and maxillary, naked. Scales with 7 to 22 basal radiating striae; 25 to 162 apical denticles, with 5 or 6 transverse series of basal elements; circuli fine.

D. VI-I, 9, 1, third spine $2\frac{1}{5}$ to $2\frac{1}{2}$ in total head length, first ray $1\frac{1}{5}$ to $1\frac{7}{8}$; A. II, 8, 1, second spine $2\frac{2}{5}$ to $3\frac{1}{10}$, first ray $1\frac{7}{8}$ to 2; caudal $1\frac{1}{4}$ to $1\frac{1}{3}$, hind edge little emarginate; least depth of caudal peduncle $2\frac{4}{5}$ to 3; pectoral $1\frac{1}{5}$ to $1\frac{7}{8}$; ventral 2 to $2\frac{1}{5}$.

Ground color pale brown. Nine longitudinal dark brown bands, slightly narrower than pale interspaces; in many specimens, especially smaller ones more or less alternately paler where often little narrower, especially so on head; above lateral line dark bands follow longitudinally at scale junctures, but below lateral line extend midway over scale exposures. Young often with contrasted median blackish spot at caudal base, often size of pupil, usually with age whole base of caudal fin becoming diffuse dark brown, even extending out on upper and lower caudal edges as narrowly dusky. Iris whitish, except as crossed by dark lateral band extending from side of snout. Fins all pale except dusky brown spinous dorsal, which darker terminally. Front edges of soft dorsal and anal little darker than rest of fin. Pectoral pale, base brown and axil pale or dark. Ventrals dusky, variably paler in some examples.

Red Sea, Arabia, East Africa, Zanzibar, Mauritius, Reunion, Madagascar, India, East Indies, Philippines, Queensland, Polynesia.

15158, 16293. Alibijaban Island, Ragay Gulf, Luzon Island. March 6, 1909. Length 78 to 83 mm.

23491. Balikias Bay, Lubang, southern Luzon. July 14, 1908. Length 90 mm.

17028. Bisucay Island, near Cuyo, Cuyo Islands. April 9, 1909. Length 163 mm.

7489. Bolalo Bay, Palawan. April 22, 1908. Length 128 mm.

23061, 24095, 24096. Bolalo Bay. December 21, 1908. Length 58 to 92 mm.

8875. Buang Bay, Talajit Island. March 15, 1909. Length 145 mm.

14804, 15557, 15559. Bugsuk Island, Balabac. January 5, 1909. Length 92 to 104 mm.

17849, 17850. Bumbum Island, vicinity of Jolo. September 15, 1909. Length 101 to 103 mm.

208. Busin harbor, Burias Island. March 8, 1909. Length 90 mm.

16776, 16803. Busin Harbor. March 7, 1909. Length 78 to 95 mm.

7485, 23571, 23574. Busin Harbor. April 22, 1908. Length 90 to 140 mm.

16411. Cagayan Island, Jolo Sea. March 31, 1909. Length 203 mm.

14249. Candaraman Island, North Balabac Strait. January 4, 1909. Length 63 mm.

17068, 23090 to 23092, 24093. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 73 to 132 mm. 6 examples.

15078, 15088, 15090, 15093, 15095, 15097. Capulaan Bay, Pagbilao Island. February 24, 1909. Length 61 to 86 mm.

11842, 23647, 23648. Caracaran, Batan Island. June 8, 1909. Length 79 to 154 mm.

6 examples. Cataingan Bay, Masbate Island. April 18, 1908. Length 46 to 83 mm.

24055. Cataingan Bay. April 17, 1908. Length 62 mm.

7982 to 8008, 8497. Catbalogan, Samar. April 16, 1908. Length 84 to 160 mm

12257. Caxisigan Island, north Balabac Strait. January 2, 1909. Length 165 mm.

17723, 17725. Cuyo, Cuyo Island. April 9, 1909. Length 160 to 192 mm.

23493 to 23495, 23074 to 23076. Endeavor Strait, northwest coast of Palawan. December 22, 1908. Length 66 to 108 mm. 15 examples.

132, 133, 15743, 16310 to 16313, 16317 to 16319. Endeavor Strait. December 23, 1908. Length 66 to 105 mm.

- 14108, 14109. Endeavor Strait. December 24, 1908. Length 75 to 87 mm.
 16650, 16654. Galera Bay, Mindoro. June 9, 1908. Length 50 to 92 mm.
 11869. Gubat, Luzon. June 23, 1909. Length 93 mm.
 23521. Guinayan Island, eastern Luzon. June 4, 1909. Length 86 mm.
 10914, 10915. Isabel, Basilan Island. April 11, 1909. Length 162 to 168 mm.
 17336, 17334, 17346, 23946. Isabel. September 11, 1909. Length 73 to 95 mm.
 5326 to 5330. Jolo reefs. March 6, 1908. Length 148 to 177 mm.
 18553. Langao Point, east coast of Luzon. June 24, 1909. Length 170 mm.
 5735, 16143, 16144. Mahinog, Camiguin Island. August 3, 1909. Length 110 to 175 mm.
 15000, 15004 to 15007, 15800, 23035 to 23038, 23080 to 23083, 23388 to 23389. Makesi Island, Palawan. April 5, 1909. Length 65 to 125 mm. Male with buccal eggs.
 6199. Malapascua Island, north of Cebu. March 16, 1909. Length 162 mm.
 16399, 21136. Mansalay, Mindoro. June 4, 1908. Length 155 to 157 mm.
 7308. Masbate, Masbate Island. April 21, 1908. Length 118 mm.
 18617. Mompog, near Marinduque. March 3, 1909. Length 182 mm. [1190.] Stripes alternately dark red brown and silvery, coppery sheen over all. Hind half of opercle dark. First dorsal dusky, darkest at front and tip, other vertical fins pale reddish, fronts of dorsal and anal and edges of caudal darker. Pectoral like dorsal, dark at base. Ventral dark.
 5812. Nabatas Point, Samar. July 24, 1909. Length 134 mm.
 15679. Palag Bay vicinity, Luzon. June 16, 1909. Length 152 mm.
 21842, 23841 to 23844. Pandanon Island. March 23, 1909. Length 57 to 154 mm.
 22029, 22030. Panpan Point, Tara Island, between Jolo and Tawi Tawi. September 20, 1909. Length 95 to 110 mm.
 10656. Polloc, Mindanao. May 22, 1908. Length 152 mm.
 14366. Port Caltom, Busuanga Island. December 15, 1908. Length 135 mm.
 18719. Port Dupon, Leyte. March 17, 1909. Length 72 mm.
 19957, 20534. Port Galera, Mindoro. October 27, 1909. Length 77 to 111 mm.
 10483. Port Marican, Luzon. July 21, 1908. Length 110 mm.
 17166. Port Matalvi, Palawan Island. November 23, 1908. Length 64 mm.
 23099. Port Palapag, Luzon. June 2, 1909. Length 76 mm.
 14601. Port Palapag. June 3, 1909. Length 142 mm.
 Eight examples. Port Usong, Mayanpayan Island. December 17, 1908. Length 44 to 82 mm. (921).
 11734. Pujada Bay. May 15, 1908. Length 105 mm.
 18975. Quinalasag Island, Masamat Bay, Luzon. June 12, 1909. Length 140 mm.
 23556 to 23558. Rapurapu Island. June 22, 1909. Length 44 to 87 mm.
 23865. Rapurapu Island. June 29, 1909. Length 71 mm.
 Ten examples. Reef south lagoon, Tumindao Island, Sulu Archipelago. February 26, 1908. Length 67 to 109 mm.
 23095, 23096. Romblon. March 26, 1908. Length 50 to 87 mm.
 15774. Sacol Island. September 9, 1909. Length 86 mm.
 12683. San Miguel Island, Tabaco Bay, Luzon. June 4, 1909. Length 118 mm.
 23983. Santa Cruz, Marinduque Island. April 24, 1908. Length 79 mm.
 23999. Sitanki reef. September 24, 1909. Length 83 mm.
 23052. Surigao, Mindanao. May 8, 1908. Length 96 mm.
 23678. Tapiantana Island, South of Zamboanga. September 13, 1909. Length 101 mm.
 8668. Tara Island. December 15, 1908. Length 164 mm.

- 23062 to 23064. Tataan, Simalue Island. February 19, 1908. Length 79 to 105 mm. (154). 9 examples. Stripes umber, interspaces pearl gray with opalescent reflection. End of caudal peduncle and caudal base lemon yellow with black center. Top and preorbital portions of head yellowish. Fins pinkish hyaline, caudal lobes edged with dusky.
- Twelve examples. Tataan. February 20, 1908. Length 60 to 105 mm. Male with buccal eggs.
- 1 example. Tataan Pass, Simaluc Island. February 21, 1908. Length 93 mm.
10379. Tilig, Subang Island. July 15, 1908. Length 155 mm.
24056. Tonquil Island, east of Gumila Reef, south of Zamboanga. September 14, 1909. Length 67 to 74 mm. 5 examples.
- 8033, 8034. Tumindao Reef, Sulu Archipelago. February 26, 1908. Length 115 to 334 mm. (333, 334). Nine stripes of ferrugineous to umber, middle and lower ones peppered with dark specks, interspaces pearly opalescent below, olivaceous translucent above. Top of head pale yellow. Dusky yellow with black center less than size of pupil covers end of caudal peduncle and caudal base. Fins hyaline pink, caudal with dusky edges to lobes.
23515. Tulayan Island, Jolo. September 15, 1909. Length 110 mm.
- 23049, 23088, 23089, 23416 to 23419. Tutu Bay, Jolo Island, first anchorage. September 19, 1909. Length 93 to 108 mm.
8690. Tutu Bay, second anchorage. September 19, 1909. Length 79 mm.
- 9245, 19049, 19051, 19090. Varadero Bay, Mindoro. July 23, 1908. Length 106 to 189 mm.
23761. Daisy Island, west of Bumbum, vicinity north Borneo. January 6, 1910. Length 72 mm.
- 7786, 23057, 23385. Danawan and Si Amil Islands. September 27, 1909. Length 80 to 85 mm.
23575. Tifu Bay, Bouro Island. December 10, 1909. Length 98 mm.
23049. Tomahu Island. December 11, 1909. Length 76 to 117 mm. 2 examples. One male with buccal ova.
23059. Uki, Bouro Island. December 9, 1909. Length 111 mm.
- 23891 to 23894. Pendek Island, Buton Strait. December 15, 1909. Length 63 to 86 mm.
- 13705, 13706, 13709, 16227, 16228, 21122. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 81 to 106 mm.
- 9504, 14874, 23398, 23399. Dodepo and Pasejogo Islands, Gulf of Tomini, Celebes. November 16, 1909. Length 80 to 155 mm.
- 20808, 24032 to 24035. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 56 to 90 mm.
- 7212, 7213. Limbe Strait, north of Celebes. November 9, 1909. Length 157 to 165 mm.
13671. Limbe Strait. November 10, 1909. Length 95 mm.
20670. Sadaa, Gulf of Tomini, Celebes. November 17, 1909. Length 76 mm.
14418. Talisse Island, north of Celebes. November 9, 1909. Length 116 mm.
23859. Togian Bay, Togian Island, Gulf of Tomini, Celebes. November 19, 1909. Length 87 mm.
9711. Una Una Road, Binang Unang Island, Gulf of Tomini, Celebes. November 17, 1909. Length 186 mm.
- 23609 to 23612. Gane Road, Gillolo Island. December 1, 1909. Length 73 to 113 mm.
13652. Makyan Island, Gillolo Island. November 29, 1909. Length 165 mm.
- 23689 to 23692, 24049, 24050. Gomomo Island, Pitt Passage. December 3, 1909. Length 73 to 89 mm. Male with buccal ova.

23533. Tidore Island, south of Ternate. November 25, 1909. Length 101 mm.
11161. Nan Wan Bay, south Formosa. January 15, 1910. Length 176 mm.

Genus **SYNAGROPS** Günther

- Synagrops* GÜNTHER, Rep. Voy. Challenger, vol. 22, 1887, p. 16. Type *Melanostoma japonicum* STEINDACHNER and DÖDERLEIN, monotypic.
Melanostoma (not SCHINER 1860, Stål 1872) (DÖDERLEIN) STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 48, 1884, p. 5. Type *Melanostoma japonicum* STEINDACHNER and DÖDERLEIN, monotypic.
Parascombrops ALCOCK, Journ. Asiat. Soc. Bengal, vol. 58, pt. 2, 1889, p. 296. Type *Parascombrops pellucidus* ALCOCK, monotypic.
Hypoclydonia GOODE and BEAN, Ocean. Ichth., 1895, p. 236. Type *Hypoclydonia bella* GOODE and BEAN, monotypic.
Macculochina (JORDAN) JORDAN and JORDAN, Mem. Carnegie Mus., vol. 10, No. 1, 1922, p. 44. Type *Synagrops serratospinosa* SMITH and RADCLIFFE, orthotypic.

Body rather elongate, compressed. Eyes large. Jaws with bands of villiform teeth and strong canines in front; small or villiform teeth on vomer and palatines. Preopercle with angle produced, edge and ridge serrate or entire. Gill rakers 10 to 12 on lower branch of first arch. Scales rather large, cycloid, deciduous, about 30 in lateral line to caudal base. Scales on head very small. Dorsal with 9 spines, soft fin with spine and 8 or 9 rays. Anal with 2 spines and 6 or 7 rays. Caudal forked. Vent normal. Bathypelagic.

ANALYSIS OF THE SPECIES

- a*¹. SYNAGROPS. Fins all smooth, without any serrae on spines; body slender and tapering-----japonicus
*a*². PARASCOMBROPS. Ventral spines at least with an external row of serrae.
*b*¹. Only ventral spines with outer edges serrated; snout nearly long as eye; body slender, depth 3¾ to 4-----philippinensis
*b*². Front of spinous dorsal of spinous anal and of ventral spines all antorsely serrated; snout much shorter than eye; body deep, depth 3 to 3¼.-----serratospinosus

SYNAGROPS JAPONICUS (Steindachner and Döderlein)

- Melanostoma japonicum* (DÖDERLEIN) STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 48, 1884, p. 5, pl. 1, fig. 2. Tokyo.—JORDAN and SYNDER, Annot. Zool. Japon., vol. 3, 1901, p. 72 (Yokohama); Proc. U. S. Nat. Mus., vol. 23, 1901, p. 908 (copied).
- Synagrops japonicus* GÜNTHER, Rep. Voy. Challenger, vol. 22, 1887, p. 16 (copied).
- Synagrops japonica* FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925, p. 13 (Lahaina, Maui).—JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 231 (Misaki).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 165 (Lahaina, Maui).
- Melanostoma argyreum* GILBERT and CRAMER, Proc. U. S. Nat. Mus., vol. 19, 1897, p. 416, pl. 39, fig. 3. Off Hawaiian Islands, in 295 to 278 fathoms.
- Synagrops argyrea* GILBERT, Bull. U. S. Fish Comm., vol. 23, pt. 2, 1903 (1905) p. 618 (Pailolo Channel, off Oahu, off Maui, in 122 to 290 fathoms).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 8 (Guam).
- Synagrops malayanus* WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 196, fig. 52. Bali Sea, Timor Sea and Lobetobi Straits.

Depth $3\frac{1}{5}$ to $4\frac{1}{8}$; head $2\frac{3}{4}$ to $2\frac{4}{5}$, width $2\frac{1}{8}$ to $2\frac{2}{5}$. Snout 4 to $4\frac{2}{5}$ in head from snout tip; eye $3\frac{1}{3}$ to $3\frac{3}{5}$, greater than snout or interorbital; maxillary reaches $\frac{2}{5}$ to $\frac{1}{2}$ in eye, expansion $2\frac{1}{3}$ to $2\frac{1}{2}$ in eye, length $2\frac{1}{4}$ to $2\frac{2}{5}$ in head; bands of minute villiform teeth in jaws, on vomer and palatines, pair of upper front canines, pair of lower smaller closer canines and 5 or 6 canines along each mandibular ramus, also several slightly enlarged teeth in row on each palatine; interorbital $3\frac{1}{3}$ to $4\frac{1}{10}$, slightly convex; preopercle ridge entire, edge finely denticulate though denticles of lower edge larger; preorbital entire. Gill rakers 5 or 6 + 12, lanceolate, about $1\frac{1}{4}$ in gill filaments or $2\frac{3}{4}$ in eye.

Scales (pockets) 30 in lateral line to caudal base and 4 or 5 more on latter; 1 or 2 above, 5 or 6 below, 5 or 6 predorsal; 3 rows on cheek, obscurely defined. Tubes in lateral line very large, greatly exposed, broad, without basal scale; all fins more or less scaly, at least basally. Scales cycloid, very caducous; with 5 to 12 basal radiating striae; circuli fine.

D. IX-I, 9, 1, third spine $1\frac{4}{5}$ to $1\frac{1}{10}$ in total head length, first branched ray $2\frac{2}{5}$ to $2\frac{2}{3}$; A. II, 7, 1, second spine $4\frac{1}{2}$ to $5\frac{1}{2}$, first branched ray $2\frac{2}{3}$ to $2\frac{4}{5}$; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, forked, slender lobes pointed; least depth of caudal peduncle $3\frac{1}{2}$ to 4; pectoral $1\frac{2}{3}$ to $1\frac{2}{3}$; ventral $1\frac{4}{5}$ to $1\frac{7}{8}$.

Rather deep umber brown with slight mauve tint, lower surface of head and body with dull silvered tint all more or less soiled with dark brownish, also with some lavender or purplish reflections. Iris with brassy or dull golden. Fins all dull brownish, pectorals paler to whitish. Smaller examples with lighter and more silvery white on sides and below.

East Indies, Japan, Micronesia, Hawaii.

- (D. 5538), 2967. Apo Light, S. 64° W., 7.3 miles ($9^{\circ} 08' 15''$ N., $123^{\circ} 23' 20''$ E.), between Negros and Siquijor. August 19, 1909. In 256 fathoms. Length 165 mm.
- (D. 5366), 1433. Escarceo Light, S. 5° E., 7.7 miles ($13^{\circ} 39' 30''$ N., $120^{\circ} 58' 30''$ E.), Batangas Bay, Luzon. February 22, 1909. In 240 fathoms. Length 190 mm.
- (D. 5280), 10118. Malavatuan Island (N.), S. 60° W., 6.10 miles ($13^{\circ} 55' 20''$ N., $120^{\circ} 25' 55''$ E.), vicinity southern Luzon. July 17, 1909. In 193 fathoms. Length 156 mm.
- (D. 5524). One example. Point Tagolo Light, S. 40° W., 6.7 miles ($8^{\circ} 48' 44''$ N., $123^{\circ} 27' 35''$ E.), northern Mindanao. August 10, 1909. Length 112 mm.
- (D. 5518). 3 examples. Point Tagolo Light, S. 64° W., 8.7 miles ($8^{\circ} 48' 30''$ N., $123^{\circ} 31' 30''$ E.), northern Mindanao. August 9, 1909. In 200 fathoms. Length 97 to 124 mm.
- (D. 5374), 2994. Tayabas Light (outer), N. 9° E., 7.4 miles ($13^{\circ} 46' 45''$ N., $121^{\circ} 35' 08''$ E.), Marinduque Island. March 2, 1909. In 190 fathoms. Length 185 mm.
- (D. 5617). 4 examples. Ternate Island (S. E.) S. 45° W., 7 miles ($00^{\circ} 49' 30''$ N., $127^{\circ} 25' 30''$ E.). November 27, 1909. In 131 fathoms. Length 64 to 67 mm.

SYNAGROPS PHILIPPINENSIS (Günther)

Acropoma philippinense GÜNTHER, Rep. Voy. Challenger, vol. 1, 1880, p. 51. Philippines, in 82 to 102 fathoms.—ALCOCK, Journ. Asiat. Soc. Bengal, vol. 62, pt. 2, 1894, p. 116.

Synagrops philippinense ALCOCK, Journ. Asiat. Soc. Bengal, vol. 65, pt. 2, 1896, p. 311 (Indian coast, 60 to 100 fathoms).

Synagrops philippinensis REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, 1905, p. 329 (Sea of Oman, 170 fathoms).

Parascombrops pellucidus ALCOCK, Journ. Asiat. Soc. Bengal, vol. 58, pt. 2, 1889, p. 296, pl. 22, fig. 1. Sixteen miles east Devi River mouth off Mahanaddi Delta, in 68 fathoms and N. Lat. 20° 18', E. Long. 90° 50' in 65 fathoms (Bengal Bay).

Synagrops natalensis GILCHRIST, Fisher. Marine Biol. Surv., Rep. No. 2, 1921 (1922), p. 69. Off South Africa in 233 fathoms.

Depth $3\frac{3}{4}$ to 4; head $2\frac{2}{5}$ to $2\frac{3}{5}$, width $2\frac{3}{4}$ to $2\frac{1}{2}$. Snout 4 to $4\frac{1}{2}$ in head from snout tip; eye $3\frac{1}{4}$ to 4, longer than snout in young to subequal with age, always greater than interorbital; maxillary reaches $\frac{2}{5}$ to $\frac{1}{2}$ in eye, expansion 2 in eye, length $2\frac{1}{2}$ to $2\frac{3}{5}$ in head; teeth minute, in villiform bands in jaws, on vomer and palatines pair of rather long upper front canines, greatly smaller closer front lower pair and 3 large lateral canines in each mandibular ramus; interorbital $4\frac{1}{2}$ to $5\frac{2}{5}$, depressed; preopercle ridge with several denticles at angle, lower edge denticulate and hind edge entire; pre-orbital entire. Gill rakers 2+10, with 3 to 5 more very obsolete tubercles above and below; lanceolate, subequal with gill filaments and $\frac{1}{2}$ of eye.

Scales (pockets) 25 or 26 in lateral line to caudal base and 2 more on latter; 2 above, 7 below, 5 or 6 predorsal, 2 or 3 ? rows on cheek. Tubes large, each well exposed, simple, without basal scale; soft dorsal, anal and caudal all more or less finely scaled. Scales cycloid, very caducous; with 8 basal radiating striae; circuli fine.

D. IX—I, 8, 1 or 9, 1, third spine $2\frac{1}{8}$ to $2\frac{1}{2}$ in total head length, first branched ray $2\frac{7}{8}$ to 3; A. II, 6, 1 or 7, 1, second spine $4\frac{7}{8}$ to $5\frac{1}{2}$, first branched ray $2\frac{2}{3}$ to 3; caudal $1\frac{3}{5}$ to $1\frac{4}{5}$, well forked, lobes sharply pointed; least depth of caudal peduncle $3\frac{3}{4}$ to $4\frac{1}{8}$; pectoral $1\frac{1}{5}$ to $2\frac{1}{8}$; ventral $1\frac{7}{8}$ to 2, front edge of spine with antrorse serrae but all other fin spines smooth.

Brown, with more or less dusky above, sides and below silvery white sprinkled with dusky gray, also with mauve lavender tints. Iris dull yellowish brown to neutral gray. Fins brownish, dorsals and caudal little deeper and spinous dorsal blackish terminally.

Arabia, Natal, India, Philippines.

(D. 5117). Sombrero Island, S. 47° E. 10 miles. January 21, 1908. 6 examples. Length 58 to 89 mm.

(D. 5121). Malabrigo Light, N. 14° W. 9 miles, east coast of Mindoro. February 2, 1908. Length 79 mm.

(D. 5273). Corregidor Light, N. 27° E. 27.25 miles, southern Luzon. July 14, 1908. 12 examples. Length 68 to 80 mm.

- 3239 (D. 5279). Malavatuan Island, S. 18° W. 5.40 miles. July 17, 1908. Length 81 mm.
- (D. 5292). Escarceo Light, N. 36° W. 3.25 miles, southern Luzon. July 23, 1908. 2 examples. Length 70 to 77 mm.
- (D. 5353). Cape Melville Light, S. 85° E. 16.8 miles, Balabac Strait. January 1, 1909. 6 examples. Length 73 to 89 mm.
- (D. 5354). Cape Melville Light, N. 85° E. 16.8 miles. January 1, 1909. Length 60 mm.
- 3227 (D. 5365). Cape Santiago Light, N. 73° W. 6.7 miles. February 22, 1909. Length 98 mm.
- 2991 (D. 5374). Tayabas Light, N. 9° E. 7.4 miles, Marinduque Island. March 2, 1909. Length 88 mm.
- (D. 5376). Tayabas Light, N. 53° W. 18.7 miles. March 2, 1909. 2 examples. Length 30 to 36 mm.
- (D. 5382). Arena Point, S. 55° W. 3.8 miles, Luzon. March 6, 1909. 3 examples. Length 58 to 72 mm.
- 2947 (D. 5392). Tubig Point, N. 49° E. 5 miles, Destacado Island. March 13, 1909. Length 71 mm.
- (D. 5393). Panalangan Point, S. 59° E. 14.8 miles, Talajit Island. March 13, 1909. 11 examples. Length 59 to 109 mm.
- 2342 (D. 5396). Panalangan Point, S. 78° E. 4.5 miles, Talajit Island. March 15, 1909. Length 76 mm.
- 2074 (D. 5397). Panalangan Point, S. 78° E. 6 miles. March 15, 1909. Length 79 mm.
- 2842, 2843 (D. 5403). Capitancillo Island Light, S. 46° W. 15.7 miles. March 16, 1909. Length 105 to 135 mm.
- (D. 5412). Louis Point Light, N. 21° E. 5.5 miles. March 23, 1909. Length 96 mm.
- (D. 5416). Louis Point Light, N. 12° E., 2.9 miles (10° 11' 30'' N., 123° 53' 30'' E.), between Cebu and Bohol. In 150 fathoms. March 25, 1909. Length 128 mm.
- 1928 (D. 5417). Louis Point Light, N. 10° E. 3.5 miles. March 25, 1909. Length 66 mm.
- (D. 5418). Louis Point Light, N. 16° E. 5.6 miles. March 25, 1909. 2 examples. Length 67 to 69 mm.
- 2983 (D. 5419). Louis Point Light, N. 27° E. 17.8 miles. March 25, 1909. Length 62 mm.
- 4313 (D. 5420). Cruz Point, S. 20° E. 6 miles, Bohol Island. March 25, 1909. Length 81 mm.
- 4051, 4063 (D. 5453). Legaspi Light, S. 58° W. 4.5 miles, Luzon. June 7, 1909. Length 64 to 75 mm.
- (D. 5501). Macabalan Point Light, S. 35° E. 8.2 miles, Mindanao. August 4, 1909. 8 examples. Length 60 to 90 mm.
- 2011 (D. 5502). Macabalan Point Light, S. 35° E. 8.2 miles. August 4, 1909. 6 examples. Length 64 to 128 mm.
3158. (D. 5503). Macabalan Point Light, S. 31° E. 6.6 miles. August 4, 1909. 3 examples. Length 57 to 129 mm.
- 3749, 3751 (D. 5504). Macabalan Point Light, S. 39° E. 6 miles. August 5, 1909. Length 58 to 124 mm.
- 1398, 1399, 1400 (D. 5505). Macabalan Point Light, S. 31° E. 7.7 miles. August 5, 1909. Length 115 to 128 mm.
- (D. 5516). Point Tagolo Light, S. 80° W. 9.7 miles, Mindanao. August 9, 1909. 16 examples. Length 67 to 100 mm.

- (D. 5517). Point Tagolo Light, S. 83° W. 10.5 miles. August 9, 1909. 13 examples. Length 69 to 88 mm.
- (D. 5518). Point Tagolo Light, S. 64° W. 8.7 miles. August 9, 1909. 4 examples. Length 88 to 98 mm.
- (D. 5519). Point Tagolo Light, S. 71° W. 8.7 miles. August 9, 1909. 13 examples. Length 72 to 96 mm.
- 1540, 1543 (D. 5537). Apo Island, S. 46° W. 8.7 miles. August 19, 1909. Length 105 to 115 mm.
- 2969, 2970 (D. 5538). Apo Island, S. 64° W. 7.3 miles. August 19, 1909. Length 112 to 114 mm.
- (D. 5545). Noble Point, Tulayan Island, S. 19° W. 3 miles. September 15, 1909. 9 examples. Length 65 to 97 mm.
- 44428 U.S.N.M. Bengal Bay. Steamer *Investigator*. Indian Museum. Length 75 to 83 mm. 6 examples. As *Parascombrops pellucidus*.

SYNAGROPS SERRATOSPINOSUS Smith and Radcliffe

Synagrops serratospinosa SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 444, pl. 38, fig. 2. Batangas Bay, Luzon (N. Lat. 13° 44' 24'', E. Long. 120° 45' 30'', in 214 fathoms).

Depth 3 to 3½; head 2⅔ to 2¾, width 2⅔ to 2½. Snout 4 to 5 in head from snout tip; eye 3 to 3⅔, greater than snout or interorbital; maxillary reaches opposite middle of eye, expansion 2½ to 2⅔ in eye, length 2¼ to 2⅓ in head; bands of minute villiform teeth in jaws, on vomer and palatines, pair of moderately small canines in front of each jaw with lower, much smaller and closer, also 3 or 4 lateral mandibular canines each side; interorbital 3½ to 3½, very slightly convex; preopercle ridge vertically entire and 5 or 6 or more denticles along horizontal portion below angle; preopercle edge denticulate, fine on vertical edge and coarser below angle; preorbital entire. Gill rakers 5 + 15, lanceolate, longer than gill filaments or 2¼ in eye.

Scales 26 to 28 in lateral line to caudal base and 2 more on latter; 2 above, 7 below, 5 predorsal, 2 little distinct rows on cheek; fins all more or less scaly, at least basally. Tubes in lateral line large, simple, well exposed, each without basal scale. Scales very caducous, mostly all fallen; 11 to 14 basal radiating striae; circuli fine.

D. IX-I, 9, 1, second spine with front edge antrorsely serrate, third spine 1⅞ to 2¼ in total head length, first branched ray 2⅔ to 3¼, also spine of soft dorsal with front edge antrorsely serrate; A. II, 7, 1, second spine 2½ to 3⅞, first branched ray 2⅔ to 2¾, front edge of second spine antrorsely serrate; caudal 1½ to 1⅔, deeply emarginate; least depth of caudal peduncle 3⅔ to 4; pectoral 1⅔ to 1¾; ventral 1⅔ to 1⅔, front edge of spine antrorsely serrate.

Brown, with drab gray to lavender tints above, sides and below paler with silvery white reflections. Iris pale yellowish white. Fins all pale, dorsals and caudal tinged dusky and spinous dorsal becomes dusky black terminally.

Philippines.

- (D. 5536), 2051, 2052. Apo Island, S. 26° W., 11.8 miles (9° 15' 45" N., 123° 22' 00" E.), between Negros and Siquijor. August 19, 1909. In 279 fathoms. Length 75 to 88 mm. 3 examples.
- (D. 5537), 1541, 1542. Apo Island, S. 46° W., 8.7 miles (9° 11' 00" N., 123° 23' 00" E.). August 19, 1909. In 254 fathoms. Length 77 to 87 mm. 6 examples.
- (D. 5538), 2968, 2971. Apo Island, S. 64° W., 7.3 miles (9° 08' 15" N., 123° 23' 20" E.). August 19, 1909. In 256 fathoms. Length 80 to 82 mm.
- (D. 5387), 3702, 3703. Bagatao Island Light (outer), S. 80° E., 27 miles (12° 54' 40" N., 123° 20' 30" E.), between Burias and Luzon. March 11, 1909. In 209 fathoms. Length 73 to 74 mm.
- (D. 5388), 3764, 3766. Bagatao Island Light (outer), S. 86° E., 21 miles (12° 51' 30" N., 123° 26' 15" E.). March 11, 1909. In 226 fathoms. Length 78 to 86 mm.
- (D. 5365), 3228, 3229, 4004 to 4008. Cape Santiago Light, N. 73° W., 6.7 miles (13° 44' 24" N., 120° 45' 30" E.), Balayan Bay, Luzon. February 22, 1909. In 214 fathoms. Length 42 to 86 mm. (Type No. 4006, No. 70254 U.S.N.M.).
- (D. 5110), 4479. Corregidor Light, N. 20° E. 25 miles (13° 59' 20" N., 120° 75' 45" E.), southern Luzon. January 15, 1908. In 135 fathoms. Length 72 mm.
- (D. 5292). 2 examples. Escarceo Light, N. 36° W., 3.25 miles (13° 28' 45" N., 121° 01' 12" E.), southern Luzon. July 23, 1908. In 162 fathoms. Length 56 to 67 mm.
- (D. 5411), 4182. Louis Point Light, N. 35° E., 4.7 miles (10° 10' 30" N., 123° 51' 15" E.), between Cebu and Bohol. March 23, 1909. In 145 fathoms. Length 78 mm.
- (D. 5412), 3079. Louis Point Light, N. 21° E., 5.5 miles (10° 09' 15" N., 123° 52' E.). March 23, 1909. In 162 fathoms. Length 51 to 79 mm. 12 examples.
- (D. 5416), 4512 to 4515. Louis Point Light, N. 12° E., 219 miles (10° 11' 30" N., 123° 53' 30" E.). March 25, 1909. In 150 fathoms. Length 51 to 74 mm.
- (D. 5417), 1929, 1930. Louis Point Light, N. 10° E., 3.5 miles (10° 10' N., 123° 53' 15" E.). March 25, 1909. In 159 fathoms. Length 71 to 77 mm.
- (D. 5418). Louis Point Light, N. 16° E., 5.6 miles (10° 08' 50" N., 123° 52' 30" E.). March 25, 1909. In 159 fathoms. Length 67 to 81 mm. 16 examples.
- (D. 5183), 1332, 1333. Lusaran Light, S. 29° E., 4 miles (10° 32' 48" N., 122° 26' E.), between Panay and Negros. March 30, 1909. In 96 fathoms. Length 61 to 65 mm.
- (D. 5501). Macabalan Point Light, S. 35° E., 8.2 miles (8° 37' 33" N., 124° 35' E.), Mindano. August 4, 1909. In 214 fathoms. Length 62 to 81 mm. 10 examples.
- (D. 5502). Macabalan Point Light, S. 35° E., 8.2 miles (8° 37' 37" N. 124° 35' E.), Mindanao. August 4, 1909. In 214 fathoms. Length 62 to 87 mm. 15 examples.
- (D. 5503), 3162. Macabalan Point Light, S. 31° E., 6.6 miles (8° 36' 26" N., 124° 36' 08" E.), Mindanao. August 4, 1909. In 226 fathoms. Length 63 to 87 mm. 20 examples.
- (D. 5504), 3752. Macabalan Point Light, S. 39° E., 6 miles (8° 35' 30" N., 124° 36' E.), Mindanao. August 5, 1909. In 200 fathoms. Length 80 mm.
- (D. 5265), 1756. Matocot Point, Luzon S. 17° E., 3.30 miles (13° 41' 15" N., 120° 00' 50" E.). June 6, 1908. In 135 fathoms. Length 91 mm.
- (D. 5517). Point Tagolo Light, S. 83° W., 10.5 miles (8° 45' 30" N., 123° 33' 45" E.), Mindanao. August 9, 1909. In 169 fathoms. Length 60 to 68 mm. 3 examples.

(D. 5523). Point Tagolo Light, S. 48° W., 6.7 miles ($8^{\circ} 48' 44''$ N., $123^{\circ} 27' 35''$ E.), Mindanao. August 10, 1909. Length 64 to 81 mm. 3 examples.

Genus *SIPHAMIA* Weber

Siphamia WEBER, Notes Leyden Mus., vol. 31, 1909, p. 168. Type *Siphamia tubifer* WEBER, monotypic.

Adenapogon McCULLOCH, Rec. Austral. Mus., vol. 13, 1921, p. 132. Type *Apogon roseigaster* RAMSAY and OGILBY, orthotypic.

Band of villiform teeth in each jaw, without canines and some minute teeth on vomer; palatines with or without teeth. Preopercle edge entire, ridge serrated (entire in *Adenapogon*). Gill rakers lanceolate, about 12 on lower limb of first gill arch. Scales ctenoid or cycloid (*Adenapogon*). Cheeks largely or entirely scaleless. Lateral line complete. Silvery canal extends backwards on each side from tongue to caudal peduncle near ventral surface. First dorsal with 6 spines, anal with 2. Soft dorsal and anal with 10 rays.

According to McCulloch the silvery lateral gland is likely a phosphorescent organ.

SIPHAMIA VERSICOLOR (Smith and Radcliffe)

Amia versicolor SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 257, fig. 3. Usada Island, near Jolo; Cataingan Bay, Masbate; Pangasinan Island; Canmahala Bay; Luzon; Sibutu Island and North Balabac Strait.—FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines); Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 273 (Philippines).

Depth $2\frac{2}{5}$ to $2\frac{3}{5}$; head 2 to $2\frac{1}{8}$, width $1\frac{7}{8}$ to $2\frac{2}{5}$. Snout $3\frac{7}{8}$ to $4\frac{1}{4}$ in head from snout tip; eye $2\frac{4}{5}$ to 3, greatly longer than snout or interorbital; maxillary reaches $\frac{4}{5}$ or to hind eye edge, expansion $1\frac{3}{4}$ to 2, length $1\frac{7}{8}$ to 2 in head; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $3\frac{4}{5}$ to 4, scarcely convex; preopercle ridge entire, edge finely serrate. Gill rakers 3+12, lanceolate, uppermost 2 and lowermost 4 rudimentary tubercles, twice gill filaments or $1\frac{7}{8}$ in eye. Deep gash on lower inner face of gill opening.

Scales 20 to 23 in lateral line to caudal base and 2 or 3 more on latter; 2 above, 6 below, 4 predorsal, 2 rows on cheek. Lateral line with large simple tubes, well exposed, with only small trace of basal scale. Muzzle, including interorbital, suborbitals and maxillary, naked. Scales with 7 basal radiating striae; no apical denticles; circuli moderate.

D. VII–I, 9, 1, third spine $2\frac{1}{4}$ to $2\frac{1}{3}$ in total head, second ray $2\frac{1}{5}$ to $2\frac{1}{4}$; A. II, 8, 1, second spine $4\frac{1}{8}$ to $4\frac{3}{4}$, second ray $2\frac{1}{3}$ to $2\frac{3}{4}$; caudal $1\frac{1}{5}$ to $1\frac{4}{5}$, little emarginate behind; least depth of caudal peduncle $3\frac{2}{5}$ to 4; pectoral 2 to $2\frac{1}{5}$; ventral $1\frac{1}{10}$ to 2.

General color grayish white, with scattered dusky to blackish dots. Deep brown band begins on snout above, extends over eye to bases of last dorsal rays. Second band from side of snout crosses eye and

follows median body axis to caudal base. Third dark band from infraorbital to pectoral base and then along lower surface of caudal peduncle narrowly. Below lowest dark lateral band scales all with very fine, vertical dusky lines, though not extending on the ventral ridge. Iris pinkish. Fins all pale except some dusky dots on spinous dorsal over spines and at bases of soft vertical fins. Many examples variably darker or with metallic dusky appearance and the horizontal dark bands obscured. Also many show rows of minute papillae on the head and over the scales of the lateral line.

Though dusky largely in coloration and with striking dark longitudinal bands, this species readily fades in alcohol. Our series from Canmahala Bay is such an example. These specimens are not only without the dark bands but are largely more slender. They have, however, the very diagnostic longitudinal silvery pigmented area on the chest, belly and under surface of the tail, besides very obscure traces of the dark bands. It is very close to *Apogon argyrogaster* Weber,⁹ but that species is said to have 9 anal rays and be without blackish longitudinal bands. An interesting note given with the type of *Amia versicolor* is as follows:

A species not hitherto met with, 45 mm. long, of a dull red brown color, was taken in abundance in one seine haul. When placed alive in a bottle of water, the water was immediately filled with the young. The eggs had already been noticed in the mouths of several specimens.

(D. 5182), 4310. Antonia Island, off eastern Panay. March 27, 1908. Length 30 mm.

Thirty-two examples. Canmahala Bay, Luzon. March 11, 1909. Length 21 to 44 mm.

Fifty-one examples. Cataingan Bay, Masbate Island. April 18, 1908. Length 27 to 39 mm. (Type No. 68401, U.S.N.M. Length 39 mm.)

(D. 5137). 2 examples. Jolo Light, S. 61° E., 1.30 miles. February 14, 1908. Length 27 to 37 mm.

(D. 5138). 3 examples. Jolo Light, S. 19° E., 2.50 miles. February 14, 1908. Length 30 to 35 mm.

(D. 5140). 2 examples. Jolo light, S. 33° W., 6.10 miles. February 14, 1908. Length 31 to 37 mm.

(D. 5141). Jolo Light, S. 17° W., 5.50 miles. February 15, 1908. Length 30 mm.

(D. 5142). Jolo Light, S. 50° W., 3.90 miles. February 15, 1908. Length 41 mm.

(D. 5174). 3 examples. Jolo Light, E. 2.60 miles. March 5, 1908. Length 41 to 54 mm.

(D. 5356). North Balabac Straits, Palawan Island. January 5, 1909. Length 53 mm.

(D. 5145). Jolo Light, S. 16° E., 0.85 mile. February 15, 1908. Length 30 mm.

Two examples. Pangasinan Island, vicinity of Jolo. February 13, 1908. Length 33 to 36 mm.

⁹Notes Leyden Mus., vol. 31, 1909, p. 159, near west coast of New Guinea; Siboga Exp., vol. 57, Fische, 1913, p. 233, pl. 10, fig. 7 (types).

(D. 5517), 1759. Port Tagolo Light, S. 83° W., 10.5 miles. August 9, 1909. Length 39 mm.

(D. 5179). Romblon. March 25, 1908. Length 34 mm.

(D. 5169). Sibutu Island, Sulu Archipelago. February 27, 1908. Length 31 mm.

(D. 5148). Sirun Island, Sulu Archipelago. February 16, 1908. Length 31 mm. (3961.)

(D. 5149). Sirun Island. February 18, 1908. 2 examples. Length 37 to 39 mm.

Two examples. Usada Island. March 5, 1908. Length 31 to 37 mm. (390, 389.)

General color seal brown over silvery, with reddish underlaid shades. Vertical fins vermilion, paired fins very pale vermilion. When freshly captured black markings very intense, become paler later and reds fade light.

Genus AMIOIDES Smith and Radcliffe

Amioides SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p.

440. Type *Amia (Amioides) grossidens* SMITH and RADCLIFFE, monotypic.

Body moderately long, compressed. Head large, compressed. Mandible well protruded. Teeth in villiform bands in jaws and on palate, very narrow row on vomer and palatines. Two long slender incurved canines at front of upper jaw and single symphyseal canine below. Gill rakers moderate. Scales large, ctenoid. Dorsal with 7 spines and soft fin with spine and 10 rays. Anal with 2 spines and 8 rays. One species.

AMIA GROSSIDENS Smith and Radcliffe

Amia (Amioides) grossidens SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 440, pl. 36, fig. 1. West coast of Luzon (N. Lat. 16° 36' 36'', E. Long., 120° 11' 6'' in 45 fathoms).

Depth 3; head $2\frac{1}{3}$, width $2\frac{2}{3}$. Snout 4 in head from snout tip; eye $3\frac{1}{2}$, greater than snout or interorbital; maxillary reaches $\frac{2}{5}$ in eye, expansion 2, length 2 in head; teeth villiform, in band in upper jaws, on vomer and palatines; though in both jaws outer row slightly enlarged to give place posteriorly on each mandibular ramus to 3 canines curved back; pair of wide set canines above inside outer band of teeth and single symphyseal canine below; interorbital $4\frac{1}{2}$, level; preopercle ridge entire, edge denticulated. Gill rakers 5 + 14, lanceolate, much greater than gill filaments or 2 in eye.

Scales (pockets) 22 in lateral line to caudal base and 4 or 5 more on latter; 2 above, 6 ? below, 6 ? predorsal, 2 rows on cheek; head naked except cheeks and opercles; strong curved spine, curved down and back at suprascapula. Lateral line with large tubes, arborescent. Scales finely ctenoid but mostly all now fallen, so their structure omitted.

D. VII-I, 10, 1, third spine $2\frac{1}{5}$ in total head length, first ray 2; A. II, 8, 1, second spine 3, second ray 2; caudal $1\frac{1}{2}$, emarginate behind; least depth of caudal peduncle 3; pectoral $1\frac{3}{5}$; ventral $1\frac{7}{8}$.

Back and above brown, below inclining to whitish, with silvery white on under surface of head and abdomen, some showing lilac tints. Iris silvery white. Pockets of scales on back drab brown. Transverse deeper brown band across caudal peduncle at caudal base. Dorsals and caudal dusted with brownish, other fins whitish.

Only known from the type.

(D. 5442.) One example. Lingayen Gulf, east of Point Guecet, west coast of Luzon. May 11, 1909. Length 101 mm.

Genus ACROPOMA Schlegel

Acropoma SCHLEGEL, Fauna Japonica, Poiss., pts. 2-4, 1843, p. 31. Atypic.

Type *Acropoma japonicum* GÜNTHER, affixed by GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 250.

Body oblong, compressed. Mouth large, lower jaw protruding. Jaws with small canines and palatines toothed. Opercle extends in long point. Preopercle entire. Gill rakers lanceolate, 14 to 16 on lower branch of first arch. Pseudobranchiae large. Branchiostegals 7. Scales moderate, weakly ctenoid, thin, deciduous. Vent anterior, nearer ventral base than anal origin. Dorsal with 7 to 9 spines in spinous fin, and soft fin with spine and 10 rays. Anal with 3 spines and 7 or 8 rays. Caudal emarginate or forked.

Indian Ocean, East Indies, and Japan. Apparently a single species.

ACROPOMA JAPONICUM Günther

Acropoma japonicum GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 250. Nagasaki (on SCHLEGEL); Rep. Voy. Challenger, vol. 1, 1880, p. 38 (Arafura Sea).—JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 912, fig. 10 (Wakanoura and Misaki).—JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 231 (Wakanoura).—FOWLER, Journ. Bombay Nat. Hist. Soc., 1927, p. 259 (Bombay).

Synagrops splendens LLOYD, Mem. Indian Mus., vol. 2, No. 3, 1909, p. 159 (pl. 47, fig. 5). Gulf of Oman, in 230 fathoms.

Acropoma cynodon REGAN, Ann. Mag. Nat. Hist. London, ser. 9, vol. 7, 1921, p. 415. Off Natal.—GILCHRIST, Fisher. Marine Biol. Surv. South Africa, No. 2, 1921 (1922), p. 69 (off South Africa in 150 to 230 fathoms).—BARNARD, Ann. South Afric. Mus., vol. 21, pt. 2, 1927, p. 529 (Natal coast in 130 to 230 fathoms).

Depth $3\frac{1}{4}$ to $3\frac{1}{2}$; head $2\frac{1}{4}$ to $2\frac{2}{5}$, width $2\frac{3}{5}$ to $2\frac{4}{5}$. Snout $4\frac{1}{4}$ to $4\frac{1}{3}$ in head from snout tip; eye 3 to $3\frac{1}{2}$, greater than snout or interorbital; maxillary $2\frac{1}{3}$ to $2\frac{2}{3}$ in head, reaches slightly beyond front of eye, expansion $2\frac{1}{4}$ to $2\frac{1}{3}$ in eye; teeth fine, villiform, in bands in jaws, on vomer and palatines; inner pair of upper front canines and smaller close set symphyseal pair, both pairs directed inward; interorbital level, 5 to $5\frac{1}{5}$ in head; preopercle edge and ridge entire, also preorbital. Gill rakers 6 + 12, lanceolate, slender, little longer than gill filaments or $2\frac{1}{5}$ in eye.

Scales 44 or 45 in lateral line to caudal base and 4 more on latter; 4 above, 11 below, 10 to 13 predorsal, 3 or 4 rows on cheek; head

more or less scaly except muzzle; scales largest along middle of side of body, all rather narrowly imbricated; lateral line of large short tubes, each well exposed. Scales with 6 basal radiating striae; 12 to 23 short irregular apical points; circuli fine.

D. VIII, I, 10, 1, third spine $2\frac{2}{5}$ to $2\frac{1}{2}$ in total head length, first ray $2\frac{1}{5}$ to $2\frac{1}{4}$; A. III, 7, 1, third anal spine $3\frac{3}{4}$ to $4\frac{1}{5}$, first ray $2\frac{3}{5}$ to $2\frac{3}{4}$?; caudal $1\frac{3}{5}$ to $1\frac{2}{3}$, well forked; least depth of caudal peduncle $3\frac{2}{5}$ to $3\frac{1}{2}$; pectoral $1\frac{1}{2}$ to $1\frac{3}{5}$; ventral $2\frac{1}{4}$ to $2\frac{1}{3}$.

Back brown, below whitish and body everywhere with silvery white sheen. Fins all pale brownish. In preserved examples after very caducous scales fall from young, breast, belly and lower surface of tail thickly dotted with dusky, though dotted area not extending above base of pectoral.

Gulf of Oman, Natal, India, East Indies, Philippines, Japan. We fail to find the nominal *Synagrops splendens* Lloyd and *Acropoma cynodon* Regan, differing in any specific way from our other materials. The distinctions given are largely of minor importance. Regan's fish was larger, or 165 mm. long.

3010 (D. 5376). Tayabas Light, N. 53° W. 18.7 miles. March 2, 1909. Eight examples. Length 36 to 98 mm. (1184). Silvery, rosy above, steel blue and blackish shades below. Fins rosy. Anal with some blackish basally and ventrals with black.

(D. 5193). Chocolate Island, N. 77° E., 8 miles off northern Cebu. April 3, 1908. Length 36 mm.

Family CHANDIDAE

Body more or less elevated, ventral edge rounded, often somewhat transparent. Head compressed. Mouth oblique to nearly vertical. Teeth conic, in bands in jaws and on vomer and palatines. Preorbital and preopercle usually with serrated ridges and edges. Gill membranes free. Pseudobranchiae present. Branchiostegals 6. Lower pharyngeals not coalesced. Scales cycloid. No elongate axillary scale. Lateral line usually complete, variably interrupted or incomplete, or even absent. Dorsal base in deep scaly sheath; spines 7, compressed and transversely striated, anteriorly another short procumbent spine; rays 8 to 17. Anal spines 3, rays 8 to 18. Caudal usually forked, rays 15. Pectoral rays branched. Ventral with spine and 5 rays.

A small family and though several genera have been admitted at various times, the species are homogeneous. Fishes of small size in the Indo-Pacific, usually brilliant or silvery white in color. They live in the sea and about the mouths of rivers, some in fresh water near the sea. Though all have a very similar appearance they are easily distinguished from the Amiidae by the combination of cycloid scales, basal dorsal and anal sheath, procumbent predorsal spine,

dorsals usually joined basally, usually the presence of three anal spines and their silvery coloration.

We admit the genera *Tetracentrum* Macleay and *Hamiltonia* Swainson, *Chanda* Buchanan-Hamilton, *Parambassis* Bleeker and *Ambassis* Cuvier, as defined by Fowler in 1905. As *Chanda* is the oldest generic name, Chandidae follows as the accepted family name.

ANALYSIS OF THE GENERA

- a¹. Outer series of teeth, at least anteriorly in the jaws, conspicuously enlarged or somewhat caninelike; scales usually quite small.....*Parambassis*
 a². Teeth uniformly small, none prominently enlarged, usually in villiform bands; scales large*Ambassis*

Genus *PARAMBASSIS* Bleeker

Parambassis BLEEKER, Naturk. Verh. Holland. Maatsch., Haarlem, vol. 2, ser. 3, 1874, pp. 86, 102. Type *Ambassis apogonoides* BLEEKER, orthotypic.

Teeth in the jaws slender, pointed, in several series with some of outer much larger and caninelike. Scales usually small, 40 to 70 in lateral series.

In most other respects this genus greatly resembles *Ambassis*.

PARAMBASSIS APOGONOIDES (Bleeker)

Ambassis apogonoides BLEEKER, Nat. Tijds. Ned. Indië, vol. 2, 1851, p. 200. Bandjermassing, in rivers, Borneo.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 224 (copied).—ELERA, Cat. Fauna Filip., 1895, p. 467 (Rio de Catbalonga, Samar).

Parambassis apogonoides BLEEKER, Atlas Ichth. Ind. Néerland., vol. 8, 1876-77, p. 139, pl. (60) 338, fig. 1 (Sumatra and Borneo).

Depth $2\frac{2}{3}$; head $2\frac{2}{3}$. Snout $3\frac{1}{2}$ in head from snout tip; eye $3\frac{1}{2}$, subequal with snout; maxillary reaches pupil at least, expansion $\frac{2}{3}$ of eye, length $2\frac{1}{3}$ in head from snout tip; mandible protrudes; outer row of teeth in jaws enlarged; preopercle edge, also ridge and pre-orbital ridge serrate; interorbital less than eye.

Scales 38 to 40 in lateral line; 5 above, 12 below, 17 predorsal, 3 rows on cheek; dorsals and anals each with basal scaly sheaths, also caudal base scaly.

D. I, VII, I, 10, I, or 11, I, second erect spine 2 in total head length, first branched ray $2\frac{1}{2}$; A. III, 9, I or 10, I, second and third spines subequal or $2\frac{1}{2}$ in head; caudal $1\frac{1}{4}$, forked; least depth of caudal peduncle 3; pectoral $1\frac{1}{4}$; ventral $1\frac{1}{2}$.

Clear yellowish. Diffuse silvery streak from head to caudal base medially. Fins yellowish, spinous dorsal dusky terminally. (Bleeker).

East Indies. Reported from the Philippines by Elera. Bleeker had but 4 examples 52 to 90 mm.

Genus *AMBASSIS* Cuvier

Ambassis CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 130. Type *Centropomus ambassis* LACÉPÈDE, tautotypic.

Ambassus SWAINSON, Nat. Hist. Animals, vol. 2, 1839, p. (18,168) 200.

Type *Centropomus ambassis* LACÉPÈDE.

Priopis (KUHL and VAN HASSELT) VALENCIENNES, Hist. Nat. Poiss., vol. 6, 1830, p. 378. Type *Priopis argyrozona* (KUHL) VALENCIENNES, monotypic.

Body well compressed, ovoid or oblong. Head large. Eye large, little advanced. Mouth protractile, large. Maxillary exposed, without supplemental bone. Teeth villiform, in bands in jaws, on vomer and palatines and sometimes on tongue. Lower ridge and edge of preopercle serrate. Opercle without conspicuous spine. Preorbital edge serrate. Vertebrae 24 of which 14 caudal. Scales moderate or large, 25 to 40, frequently deciduous. Cheeks and opercles scaly. Dorsals divided by deep notch, spinous fin usually little higher or second erect spine longest. First anal spine short, second and third subequally long, usually longer than soft rays. Ventral below pectoral base, with scaly basal flap.

The species we include in this genus are all more or less similar in both shape and coloration. They are all embraced in Bleeker's Atlas except *Ambassis nalua* (Buchanan-Hamilton), which was not obtained in the *Albatross* explorations. A number of nominal species have been described in late years, chiefly from tropical Australia.

ANALYSIS OF THE SPECIES

- a*¹. *AMBASSIS*. Scales 24 to 30 in lateral line to caudal base; cheek with 1 or 2 rows of scales; second and third anal spines subequally long.
- b*¹. Predorsal scales 7 to 14; lateral line complete; eye more than $\frac{1}{3}$ of head.
- c*¹. Depth $2\frac{1}{2}$ to $2\frac{2}{5}$; eye $2\frac{3}{4}$ to $2\frac{1}{2}$ in head; interopercle dentate; black terminal blotch on second, third and fourth spinous dorsal membranes; caudal uniformly pale.....*kopsii*
- c*². Depth $2\frac{3}{4}$ to 3; eye 3 to $3\frac{1}{2}$ in head; interopercle smooth; second spinous dorsal membrane entirely black; each caudal lobe darker medianly.....*urotaenia*
- b*². Predorsal scales 14 to 20.
- d*¹. Lateral line complete; depth $2\frac{2}{5}$ to $2\frac{1}{2}$; eye 3 to $3\frac{1}{3}$ in head; second spinous dorsal membrane dusky to blackish.....*safgha*
- d*². Lateral line interrupted; eye more than $\frac{1}{3}$ of head.
- e*¹. Body deeper, depth 2 to $2\frac{1}{2}$; interopercle dentate; second spinous dorsal membrane blackish terminally.....*interrupta*
- e*². Body more slender, depth $2\frac{2}{5}$ to $2\frac{3}{5}$.
- f*¹. Uniformly light or silvery, without black on fins.....*buroensis*
- f*². Second spinous dorsal membrane variably blackish with age.
gymnocephalus
- d*³. Lateral line complete; depth $2\frac{3}{4}$ to 3; second spinous dorsal membrane dusky to black terminally.....*batjanensis*
- aa*². *WHITLEYIA*, new subgenus. Scales about 40 to 46 in lateral line to caudal base; cheek with 7 rows of scales; second erect dorsal and anal spines enlarged and prominent, former higher than soft dorsal.....*wolffi*

Subgenus *AMBASSIS* Cuvier

Scales large, 24 to 30 in lateral line to caudal base. Cheek with 1 or 2 rows of scales. Second and third anal spines subequally long.

AMBASSIS KOPSII Bleeker

Ambassis kopsii BLEEKER, Nat. Tijds. Nederland. Indië, vol. 15, 1858, p. 253. Singapore.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 224 (copied).—PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 255 (Pulo brani, Singapore).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 275 (Philippines).

Ambassis kopsi BLEEKER, Atlas Ichth. Ind. Néerland., vol. 8, 1876-77, p. 134, pl. (66) 344, fig. 1 (Singapore and Banka).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 18 (Cavite).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 255 (Iloilo).—SEALE, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 274 (Sandakan, Borneo).

Ambassis ambassis (not LACÉPÈDE) FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippine material).

Depth $2\frac{1}{3}$ to $2\frac{2}{5}$; head $2\frac{1}{3}$ to $2\frac{3}{5}$, width $2\frac{1}{4}$ to $2\frac{2}{5}$. Snout $4\frac{1}{8}$ to $4\frac{3}{5}$ in head from snout tip; eye $2\frac{3}{4}$ to $2\frac{4}{5}$, much greater than snout or interorbital; maxillary reaches about $\frac{1}{3}$ in eye, expansion $2\frac{1}{4}$ to $2\frac{2}{3}$ in eye, length $2\frac{1}{8}$ to $2\frac{1}{3}$ in head from snout tip; teeth fine, villiform, in narrow bands in jaws, on vomer and palatines; interorbital 4 to $4\frac{1}{5}$, very slightly convex; 1 to 3 postero-supraorbital serrae; lower preorbital edge with 7 or 8 serrae and ridge with smaller and less conspicuous serrae; preopercle ridge and edge below serrate, hind edge also serrate but not vertical ridge and spine at angle of ridge broad, triangular, well developed. Gill rakers 7 + 17 or 18, finely lanceolate, $\frac{1}{2}$ of eye; gill filaments $\frac{3}{5}$ of gill rakers.

Scales 25 or 26 in lateral line to caudal base and 3 or 4 more on latter; 2 or 3 scales above, 7 below, 9 or 10 predorsal form median keel nearly to middle of interorbital, 2 rows on cheek; caudal with small scales basally; dorsals and anals with basal scaly sheaths. Scales with 4 or 5 basal radiating striae; circuli fine, especially apically.

D. VII, I, 10, 1, second spine $1\frac{2}{5}$ to 2 in total head length, first ray $1\frac{7}{8}$ to $2\frac{1}{5}$; A. III, 8, 1, third spine $1\frac{4}{5}$ to $2\frac{1}{5}$; caudal $1\frac{1}{5}$ to $1\frac{1}{4}$, deeply emarginate; least depth of caudal peduncle $2\frac{2}{5}$ to $2\frac{4}{5}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{2}{5}$ to $1\frac{7}{8}$.

Back and above pale brown, below lighter or whitish, upper surfaces dusted with minute dusky dots. Silvery white axial lateral band from head to caudal base. Iris white, with dark shade above. Fins all largely pale brownish, except black blotch terminally on membranes of spinous dorsal between second to fifth erect spines.

East Indies and Philippines. A well marked species with large scales and a contrasted terminal blotch of black on apex of spinous dorsal.

Five examples. Basut River, Canimo Pass, east coast Luzon. June 15, 1909. Length 32 to 64 mm.

Fourteen examples. Buena Vista, Guimaras Island, Iloilo Strait. January 14, 1909. Length 50 to 75 mm.

- 9113, 21183 to 21185. Catbalogan, Samar Island. April 15, 1908. Length 20 to 92 mm. 10 examples.
- Six examples. Catbalogan. April 16, 1908. Length 17 to 68 mm.
- 19392, 19393. Iloilo market, Iloilo, Panay. March 28, 1908. Length 73 to 77 mm.
- 20202, 20203. Langley Point, Cavite. March 23, 1908. Length 76 to 85 mm.
5539. Malabon Market. August 8, 1908. Length 40 mm.
- Twenty-two examples. Malampaya River, Palawan Island. December 26, 1908. Length 40 to 93 mm.
- One example. Manila, Luzon. December 6, 1907. Length 55 mm.
- Fourteen examples. Manila Bay. December 9, 1907. Length 53 to 77 mm.
- Four examples. Manila Harbor. December 30, 1907. Length 58 to 72 mm.
- Four examples. Manila Harbor. January 13, 1908. Length 60 to 63 mm.
19502. Manila market. December 12-18, 1908. Length 53 mm.
- 17562, 17563, 19428. Sorsogon market. March 12, 1909. Length 50 to 76 mm.
- Nine examples. Sandakan Bay, Borneo. March 2, 1908. Length 54 to 78 mm.
- Three examples. Sandakan market, Borneo. March 2, 1908. Length 60 to 77 mm.

AMBASSIS UROTAENIA Bleeker

- Ambassis urotaenia* BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 257. Amboina; Wahai, Ceram.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 224 (copied).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 18 (Seychelles, fresh waters).—MARTENS, Reisen Ost Afrika von der Decken, vol. 3, pt. 1, 1869, p. 141 (Seychelles).—DAY, Proc. Zool. Soc. London, 1870, p. 681 (Andamans and Nicobars); Fishes of India, pt. 1, 1875, p. 55, pl. 15, fig. 8 (Andamans).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 8, 1876-77, p. 135, pl. (66) 344, fig. 2, pl. (73) 351, fig. 1 (Sumatra, Nias, Singapore, Banka, Celebes, Sangir, Ternate, Buru, Batjan, Ceram, Amboina).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (Manado, Celebes).—GORGOZA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 283 (Rio Pasig).—DAY, Fauna Brit. India, vol. 1, 1889, p. 489.—WEBER, Zool. Ergebn. Reise Nederland. Oost Ind., vol. 3, 1894, p. 408 (Moros River mouth at Tello, Celebes).—ELERA, Cat. Fauna Filip., 1895, p. 467 (Luzon, Manila, Rio Pasig).—WEBER, Zool. Jahrb., Syst. Geogr. Biol., vol. 10, pt. 2, 1897, p. 142 (mouth Umehloit River, Natál).—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 415 (Ternate).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 75 (Bacon).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 255 (Calayan and Iloilo).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 216 (Dongala, Celebes; Laiwui, Obi major; Kawa, Ceram).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 220 (Delagoa Bay); 1927, p. 275 (San Fernando, Santa Maria, Vigan and Bacon, Philippines).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 642 (Natal coast, Delagoa Bay).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 167 (Suva, Kusai, Ponapé).
- Priopis urotaenia* SMITH and SEALE, Proc. Biol. Soc. Washington, vol. 19, June 4, 1906, p. 77 (Mindanao and Bacon).—SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 242 (Zamboanga).—SEALE, Philippine Journ. Sci., vol. 9, 1914, p. 65 (Hong Kong).
- Ambassis commersonii* (not CUVIER) RÜPPELL, Neue Wirbelth., Fische, 1835, p. 89 (Red Sea).
- Ambassis denticulata* KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 719. Red Sea; Fische Roth. Meer., 1889, p. 24, pl. 3, fig. 4.
- Ambassis miops* GÜNTHER, Proc. Zool. Soc. London, 1871, p. 655. Rarotongia; Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 18 (type).—WEBER

and BEAUFORT, Nova Caledonia, *Saras. Roux*, vol. 2, pt. 1, 1915, p. 31 (Oubatche River, Bondé).—FOWLER, *Mem. Bishop Mus.*, vol. 10, 1928, p. 166 (Apia).

Ambassis lafa JORDAN and SEALE, *Bull. Bur. Fisher.*, vol. 25, 1905 (1906), p. 235, fig. 46. Vaisigano River, Apia, Samoa.—SNYDER, *Proc. U. S. Nat. Mus.*, vol. 42, 1912, p. 413 (Tanegashima).—FOWLER, *Bull. Bishop Mus.*, No. 22, 1925, p. 32 (Samoa).

Priopis lungi JORDAN and SEALE, *Bull. Bur. Fisher.*, vol. 26, 1906 (1907), p. 18, fig. 6. Cavite, Philippines.—SEALE and BEAN, *Proc. U. S. Nat. Mus.*, vol. 33, 1907, p. 242 (Zamboanga).

Ambassis lungi EVERMANN and SEALE, *Bull. Bur. Fisher.*, vol. 26, 1906 (1907), p. 75 (Bacon).

Depth $2\frac{3}{4}$ to $2\frac{7}{8}$; head $2\frac{2}{3}$ to $2\frac{3}{4}$, width $2\frac{1}{5}$ to $2\frac{1}{2}$. Snout $4\frac{1}{4}$ to $4\frac{1}{2}$ in head measured from snout tip; eye 3 to $3\frac{1}{5}$, greater than snout or interorbital; maxillary reaches front eye edge or first fifth in eye, expansion $3\frac{3}{4}$ to 4 in eye, length $2\frac{1}{2}$ to $2\frac{2}{3}$ in head from snout tip; teeth fine, slender, very small, in narrow bands in jaws, on vomer and palatines, also median row down tongue; interorbital 4 to $4\frac{1}{2}$, slightly convex; 1 or 2 supero-posterior supraorbital spines; preorbital edge below with 7 or 8 spines and ridge with few smaller ones inconspicuous; lower ridge and edge of preopercle serrate, serrae on latter little larger, and angle of ridge with rather broad triangular spine. Gill rakers 7 or 8 + 18 or 19, slender, lanceolate, 2 in eye; gill filaments $\frac{1}{2}$ of gill rakers.

Scales 26 to 28 in lateral line to caudal base and 4 or 5 more on latter; 4 scales above, 8 below, 12 to 14 predorsal forward in posterior interorbital forming median keel, 2 rows on cheek and preopercle flange naked; caudal with fine scales basally; basal scaly sheaths one scale wide along dorsals and anal. Scales with 7 or 8 basal radiating short marginal striae; circuli moderately fine.

D. VII, I, 9, 1, second erect spine $1\frac{2}{5}$ to $1\frac{3}{5}$ in total head length, first ray 2 to $2\frac{1}{5}$; A. III, 10, 1, or 11, 1, third spine $1\frac{3}{5}$ to 2; caudal 1 to $1\frac{1}{8}$, deeply forked, slender lobes sharply pointed; least depth of caudal peduncle $2\frac{3}{4}$ to $2\frac{4}{5}$; pectoral $1\frac{1}{5}$ to $1\frac{1}{4}$; ventral $1\frac{2}{5}$ to $1\frac{3}{4}$.

Pale brown, scales on back and upper surfaces dusted with deep brown dots, those of upper back broadly so on margins. Sides and lower surfaces paler to whitish and bright silvery white sheen over sides of head. Median silvery white band from eye to caudal, in formaline specimens with narrow neutral dusky line from gill opening to caudal base medianly and most distinct on tail. Iris silvery white. Fins pale, verticals dusted with grayish, anal paler than others. Membrane between second and third erect dorsal spines blackish.

Red Sea, Portuguese East Africa, Natal, Seychelles, India, Andamans, Nicobars, East Indies, Philippines, China, Micronesia, Melanesia, Polynesia. Most of our materials agree with the second of Bleeker's figures, or figure 1 of his plate 73. Although some speci-

mens show the lateral line incomplete, even skipping one or two scales, or the break may be simply due to the irregularity of the scale rows, we have not seen the descent exactly as Bleeker shows. We find, however, that sometimes an irregular lateral line may occur on one side of the body and on the other form an even continuous curve. Most all preserved specimens show a dark median area on each caudal lobe, possibly a good character of distinction. The rows of scales on the cheek are certainly variable. They are usually in two rows, though may even vary to the condition found in Jordan and Seale's figure of *Priopis lungi*, while more or less evenly biserial on the other cheek. Now the figure by Day of *Ambassis urotaenia* shows the scales on the cheek very large and in a single row. Many examples we find have the front half of the cheek with a single row of large deep scales and the posterior half biserial, or made up of narrower scales. We also unite *Ambassis miops* Günther and *Ambassis lafa* Jordan and Seale as synonyms.

Five examples. Bayaong River, 4 miles up, Sablayan Bay, Mindoro. December 13, 1908. Length 40 to 50 mm.

Six examples. Cabugo Bay, Catanduanes Island, east coast Luzon. June 9, 1909. Length 70 to 86 mm.

Nineteen examples. Camiguin Island, Mahinog, between Leyte and Mindanao. August 3, 1909. Length 31 to 63 mm.

Sixty-five examples. Canmahala Bay, Ragay Gulf. March 11, 1909. Length 53 to 87 mm.

Twenty-one examples. Chase Head, Endeavor Strait, Palawan. December 22, 1908. Length 50 to 76 mm.

19709, 19710. Davao, Mindanao. May 16, 1908. Length 64 to 81 mm. 7 examples.

7752. Jolo market, Jolo. February 12, 1908. Length 92 mm.

19356, 19358. Mahinog, Camiguin Island. August 3, 1909. Length 47 to 63 mm.

5533. Malabon market. August 8, 1908. Length 67 mm.

Four examples. Malugao River, Paluan Bay, Mindoro Strait. December 11, 1908. Length 28 to 40 mm.

Eight examples. Mariveles Bay, Manila Bay, Luzon. January 27, 1909. Length 57 to 65 mm.

Five examples. Mati, Pujada Bay. May 15, 1908. Length 46 to 60 mm.

7164 to 7167. Panabutan Bay, western Mindanao. February 6, 1908. Length 71 to 88 mm. 17 examples.

Two examples. Pandanon Island, between Cebu and Bohol. March 23, 1909. Length 35 to 45 mm.

Three examples. Point Jamelo, Luzon. July 12, 1908. Length 40 to 59 mm.

Nine examples. Point Jamelo, 2 miles up river. July 13, 1908. Length 66 mm.

Eighteen examples. Point Jamelo. July 13, 1908. Length 31 to 72 mm.

Nine examples. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 51 to 80 mm.

Forty-four examples. Port San Vicente. November 14, 1908. Length 35 to 85 mm.

20042. Port San Vicente. November 18, 1908. Length 50 to 66 mm. 10 examples.

One example. Ragay River, Ragay Gulf, Luzon. March 10, 1909. Length 56 mm.

9544, 12639. Santiago River, Pagapas Bay, Luzon. February 20, 1909. Length 40 to 95 mm. 45 examples.

Five examples. Subig Bay, Subig. January 7, 1908. Length 66 to 73 mm.

20555. Tilig, Lubang. July 14, 1908. Length 52 to 75 mm. 4 examples.

10857. Varadero Bay, Mindoro. July 23, 1908. Length 73 mm.

Four examples. Uki Island, Bouro Island, Dutch East Indies. Length 88 to 100 mm.

AMBASSIS SAFGHA (Forskål)

Sciaena safgha FORSKÅL, Descript. Animal., 1775, pp. xii, 53. Arabia.—BONNATERRE, Tabl. Ichth., 1788, p. 125 (Red Sea).—GMELIN, Syst. Nat. Linn., vol. 1, 1789, p. 1305 (Arabia).—WALBAUM, Artedi Piscium, vol. 3, 1792, p. 319 (on FORSKÅL).

Perca safga SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 86 (on FORSKÅL).

Centropomus safga LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 249, 256 (Arabia).

Ambassis safga ELERA, Cat. Fauna Filip., 1895, p. 467 (Luzon, Manila).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 275 (San Fernando, Santa Maria, Vigan, Philippines).

Centropomus ambassis LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 252, 282. Seas and fresh waters of Mauritius and Reunion.

Ambassis ambassis FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1905, p. 500 (Barani, Borneo); 1925, p. 220 (Natal); Mem. Bishop Mus., vol. 10, 1928, p. 166 (Fiji).

Ambassis commersonii CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 176, pl. 25. Bourbon, Pondichery, Mahé, Java.—PETERS, Arch. Naturg., 1855, p. 235 (Mozambique).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 223 (India, Amboyna, Philippines, Java, Port Essington, Australia).—GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 23.—KNER, Reise Novara, Fische, 1865, p. 41 (Java).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 18 (Pougani River, East Africa).—DAY, Fishes of Malabar, 1867, p. 15.—PETERS, Reise Mozambique, vol. 4, 1868, p. 10.—MARTENS, Reise Ost Afrika von der Decken, vol. 3, pt. 1, 1869, p. 141 (Kiliani, Molumbo River, Manbik).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 719 (Koseir, Red Sea).—DAY, Fishes of India, pt. 1, 1875, p. 52, pl. 15, fig. 3.—JATZOW and LENTZ, Abh. Senckenberg. Ges., vol. 21, 1889, p. 499 (Marovoay, West Madagascar; Kokotoni Reef, Zanzibar).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 113, pl. 41a, fig. 6.—BEAUFORT, Bijd. Dierk., Amsterdam, 1913, p. 113 (Kajeli, Buru).—ZUGMAYER, Abh. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 10 (Mekran).—BOULENGER, Cat. Fresh Water Fishes Africa, vol. 3, 1915, p. 112, fig. 85 (Zanzibar; Rovuma River; Dar es Salaam, East Africa; Orilaky River, Madagascar).

Apogon commersonii GUICHENOT, Mém. Soc. Sci. Cherbourg, ser. 2, vol. 2, 1866, p. 145 (Madagascar).

Ambassis commersoni BLEEKER, Atlas Ichth. Ind. Néerland., vol. 8, 1876-77, p. 136, pl. (74) 352, fig. 1 (not 5 as given in text) (Sumatra, Nias, Singapore, Java, Celebes, Amboyna, Philippines).—DAY, Fauna Brit. India, vol. 1, 1889, p. 488.—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 13, 1907, p. 204 (Omilaky River at Tongobory, Madagascar).—BEAUFORT, Bijd. Dierk., Amsterdam, 1913, p. 113 (Kajeli, Buru).—PELLEGRIN, Bull. Soc. Zool. France, vol. 39, 1914, p. 224 (Mahambo and Fort Dauphin,

Madagascar).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 643 (Natal coast).

Ambassis commersoni BLEEKER, Verslag. Meded. Akad. Wet. Amsterdam, ser. 2, vol. 12, 1878, p. 192 (Mabare, East Madagascar).

Ambassis macracanthus BLEEKER, Verh. Batav. Genootsch. (Percoid.), vol. 22, 1849, p. 30. Batavia, Java.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 227 (copied).—DAY, Proc. Zool. Soc. London, 1870, p. 681 (Andamans, in estuaries).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 151 (Sarangoon River, Singapore).

Ambassis productus GUICHENOT, Mem. Soc. Sci. Cherbourg, vol. 12, 1866, p. 130. Madagascar.

Ambassis klunzingeri STEINDACHNER, Sitz. Ber. Akad. Wiss. Wein, vol. 82, pt. 1, 1880, p. 238. Tohizona, Madagascar.—KLUNZINGER, Fische Roth. Meer., 1889, p. 24, pl. 3, fig. 3.

?*Apogon roseus* FISCHER, Jahrb. Hamburg. Anst., vol. 2, 1885, p. 66. Mozambique.

Priopus buruensis (not BLEEKER) FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines).

Depth $2\frac{2}{5}$ to $2\frac{1}{2}$; head $2\frac{2}{5}$ to $2\frac{3}{4}$, width $2\frac{1}{3}$ to $2\frac{3}{4}$. Snout $4\frac{3}{4}$ to 5 in head measured from snout tip; eye $3\frac{1}{4}$ to $3\frac{1}{3}$, greater than snout or interorbital; maxillary reaches $\frac{1}{4}$ in eye in young or to front eye edge with age, expansion 4 to $4\frac{1}{2}$ in eye, length $2\frac{1}{2}$ to $2\frac{3}{4}$ in head from snout tip; teeth minute, villiform, in narrow bands in jaws, on vomer, palatines and median ridge of tongue; interorbital 4 to $4\frac{1}{4}$, slightly convex; lower preorbital edge with 7 or 8 serrae, gradually larger below and preorbital ridge with row of smaller ones; a single postero-supraocular spine; lower ridge and edge of preopercle serrate, with serrae larger on edge and enlarged, flat, triangular spine at angle. Gill rakers 8+22, slender, lanceolate, $1\frac{1}{5}$ in eye; gill filaments $\frac{1}{2}$ long as gill rakers.

Scales 25 to 27 in lateral line to caudal base (sometimes 12, 14 or 12, 15) and 4 or 5 more on latter; 5 scales above lateral line, 6 below, 16 to 20 predorsal forming median keel to posterior interorbital, 2 rows on cheek and none on preopercle flange; caudal covered with small scales basally; dorsals and anals each with well-marked basal scaly sheath. Scales with 5 to 9 basal, radiating marginal striae; circuli moderately fine.

D. I, VII, I, 9, I, second erect spine $1\frac{1}{5}$ to $1\frac{1}{3}$ in total head length, first ray $1\frac{1}{8}$ to 2; A. III, 10, I, third spine $1\frac{2}{3}$ to $1\frac{1}{2}$; caudal $2\frac{2}{3}$ to $2\frac{4}{5}$ in combined head and body to caudal base, deeply forked and lobes slenderly pointed; least depth of caudal peduncle $2\frac{4}{5}$ to 3 in total head length; pectoral $1\frac{1}{5}$ to $1\frac{1}{4}$; ventral $1\frac{2}{5}$ to $1\frac{1}{2}$.

Pale brown with silvery reflections. Scales on back, especially above lateral line each dusted with brown dots marginally. Silvery white band from eye to caudal fin and in formaline forms a narrow, median, axil dusky or neutral gray line, most distinct on tail. Muzzle more or less dusted with brownish. Membrane between second and third erect dorsal spines dusky to blackish. All vertical fins with

minute dusky dots, chiefly on fin rays. Upper and lower lobes of caudal often dusted little darker. Fins otherwise all more or less pale to whitish. Iris silvery white. Preserved examples show head and lower side of body frequently with bright silvery white tints.

Red Sea, Arabia, Zanzibar, Mozambique, Natal, Madagascar, Mauritius, Reunion, Bourbon, India, Andamans, East Indies, Philippines, Queensland, Polynesia. Day's figure of *Ambassis commersonii* differs in that the cheek is shown with three rows of scales and the pre-orbital ridge entire. Bleeker's figure of *Ambassis commersoni* also does not show the preorbital ridge serrated though with the hind preopercle ridge so. Also the spinous dorsal has the entire upper terminal portion grayish, though the second membrane not darker than the rest of the fin, as in most of our specimens, and given in his description. Bleeker shows the predorsal scales large.

One example. Bagaong River, Sablayan Bay, Mindoro Strait. December 13, 1908. Length 31 mm.

Two examples. Davao, Mindanao Island. May 16, 1908. Length 30 mm.

11514 to 11517. Duwaca River, Luzon. February 25, 1909. Length 80 to 161 mm. 17 examples.

Eight examples. Malaga River, Leyte Island. July 30, 1909. Length 120 mm. 5338, 5339. Nonucan River, Camp Overton, Mindanao Island. August 6, 1909.

Length 88 to 122 mm. 7 examples.

Six examples. Paluan River, Mindoro Island. December 11, 1908. Length 35 to 55 mm.

11322. San Roque, Leyte Island. July 29, 1909. Length 110 mm.

21387, 21388. Sebatie Island. January 2, 1909. Length 67 to 80 mm.

Four examples. Yom River, Tayabas, Marinduque Island. February 25, 1909. Length 120 to 140 mm.

One example. Sandakan Bay, Borneo. March 2, 1908. Length 40 mm.

AMBASSIS INTERRUPTA Bleeker

Ambassis interrupta BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 696. Wahai, Ceram and Batavia, Java.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 226 (copied).—PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 255 (Quingo River at Calumpit, Luzon; Calbigan River, Samar).—DAY, Fishes of India, pt. 1, 1875, p. 53, pl. 15, fig. 5 (Andamans).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 8, 1876-77, p. 137, pl. (70) 348, fig. 5 (Singapore, Java, Borneo, Celebes, Batjan, Buru, Ceram, Amboina, Luzon, Samar).—MARTENS, Preuss. Exp. Ost-Asien, vol. 1, 1876, p. 386 (Singapore).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 12 (Manado, Celebes).—GORGOZA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 283 (Rio Pasig).—DAY, Fauna Brit. India, vol. 1, 1889, p. 487.—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 217 (Kawa, Ceram).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 166 (New Guinea).

Ambassis interruptus ELERA, Cat. Fauna Filip., 1895, p. 467 (Luzon, Manila, Rio Pasig).

Priopis interruptus JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 18 (Cavite).

Priopis interrupta JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 255 (Mindoro and Cuyo).

Ambassis macracanthus (not BLEEKER) DAY, Proc. Zool. Soc. London, 1870, p. 681 (Andamans and estuaries).

Ambassis interrupta var. *reticulatus* WEBER, Nova Guinea, vol. 9, pt. 4, 1913, p. 574. Merauke, Bivak Island, Sabang, Alkmaar, Rivierkamp, Verlaten Bocht.

Depth $2\frac{1}{8}$ to $2\frac{1}{5}$; head $2\frac{2}{5}$ to $2\frac{3}{5}$, width $2\frac{1}{5}$ to $2\frac{1}{4}$. Snout $4\frac{1}{8}$ to $4\frac{1}{2}$ in head from snout tip; eye $2\frac{4}{5}$ to 3, greater than snout or interorbital; maxillary reaches front eye edge or but slightly beyond, expansion $3\frac{3}{4}$ to 5 in eye, length $2\frac{1}{4}$ to $2\frac{2}{5}$ in head from snout tip; teeth villiform, small, in narrow bands in jaws, on vomer and palatines and narrow median row or band on tongue; interorbital $3\frac{1}{2}$ to $4\frac{1}{2}$, very slightly convex; single postero-supraorbital spine, none below; preorbital edge with 6 or 7 spines, ridge with few weaker serrae; lower edge and ridge of preopercle serrate, upper ridge and edge entire, also slightly enlarged spine at angle of ridge. Gill rakers $8 + 22$, slender, lanceolate, much longer than gill filaments or 2 in eye.

Scales 10 or $11 + 11 + 4$ or 5, of which last on caudal base, lateral line interrupted; 3 scales above lateral line, 8 below, 14 predorsal nearly midway in interorbital form median keel, 2 rows on cheek and preopercle flange naked; caudal with fine scales basally; basal scaly sheaths, one scale wide along dorsals and anals. Scales with 8 or 9 basal radiating striae and 4 or 5 incomplete auxiliaries; circuli fine.

D. VII, I, 9, 1, second erect spine $1\frac{1}{3}$ to $1\frac{1}{5}$ in total head length, first ray $1\frac{7}{8}$ to 2; A. III, 9, 1, second spine $1\frac{4}{5}$ to 2, often third spine longer; caudal $1\frac{1}{10}$ to $1\frac{1}{5}$, deeply forked, slender lobes sharply pointed; least depth of caudal peduncle $2\frac{3}{4}$ to $2\frac{7}{8}$; pectoral $1\frac{1}{8}$ to $1\frac{1}{5}$; ventral $1\frac{1}{3}$ to $1\frac{2}{5}$.

Pale brown generally, scales on back and upper surfaces dusted with darker brown dots, on back as broad darker marginal areas. Sides and lower surfaces with bright silvery white tints. Median diffuse silvery white band from eye to caudal. Fins all pale or with grayish dusting terminally on verticals. Membrane between second and third dorsal spines dusky to blackish. Iris silvery white.

Andamans, East Indies, and Philippines. Bleeker reports 24 examples with the largest 120 mm. long, which is much greater than any of our material.

Five examples. Alimango River, Alimango Bay, Burias Island. March 5, 1909. Length 70 to 92 mm.

Fifteen examples. Camp Overton, Iligan Bay, Mindanao. August 6, 1909. Length 63 to 83 mm.

12831. Cavite and San Roque markets. June 27, 1908. Length 92 mm.

Four examples. Chase Head, Palawan Island. December 22, 1908. Length 30 to 58 mm.

Three examples. Damplilit, Malabon. August 10, 1908. Length 46 to 74 mm.

Thirty-two examples. Dumara River. February 25, 1909. Length 50 to 82 mm.

- One example. Estero, Sablayan, Mindoro. December 13, 1908. Length 42 mm.
- Five examples. Guimaras Island, vicinity Buena Vista, Iloilo Strait. January 14, 1909. Length 55 to 75 mm.
7751. Jolo market, Jolo. February 12, 1908. Length 65 mm.
- Two examples. Laguna de Bay. June 21, 1908. Length 70 to 76 mm.
- 5516, 5518, 5520 to 5524, 5526, 5527, 5529, 5534 to 5538. Malabon market. August 8, 1908. Length 50 to 76 mm. 18 examples.
- Thirty examples. Malampaya River, Palawan. December 26, 1908. Length 31 to 92 mm.
- One example. Malcochin Harbor, Linapacan Island, Linapacan Strait. December 18, 1908. Length 31 mm.
- 9075 to 9078, 13683, 13684. Manila market. June 24, 1908. Length 83 to 105 mm.
- Eleven examples. Nato River, Luzon. June 17, 1909. Length 22 to 31 mm.
- Seven examples. Nato River. June 18, 1909. Length 25 to 45 mm.
- Three examples. Paluan River, Mindoro. December 11, 1908. Length 43 to 70 mm.
- Eight examples. Pancol, Palawan. December 25, 1908. Length 76 to 102 mm.
- Ninety examples. Pangauran River, Busuanga Island. December 16, 1908. Length 21 to 76 mm.
- Three examples. Pasacao, Refugio Island, Ragay Gulf, Luzon. March 9, 1909. Length 52 to 67 mm.
- 8484, 8485. Port Dupon, Leyte Island. March 17, 1909. Length 73 to 80 mm.
6734. Port Matalvi, Luzon. November 2, 1908. Length 57 mm.
- Seven examples. Pucot River, Mariveles, Luzon. January 29, 1909. Length 62 to 90 mm.
- 11251, 11252. Ragay River, Ragay Gulf, Luzon. March 10, 1909. Length 25 to 105 mm. 54 examples (4967 to 4982; 5386 to 5399).
- Twelve examples. River at Port Dupon, Leyte. March 17, 1909. Length 30 to 85 mm.
- One example. Stream near village at Chase Head, Endeavor River, Palawan. December 22, 1908. Length 50 mm.
- Two examples. Subig Bay. January 7, 1908. Length 63 to 67 mm.
- Twenty-three examples. Tayabas, Marinduque Island. February 25, 1909. Length 50 to 90 mm.
- 17275, 17276. Verde del Sur Island, Palawan. April 7, 1909. Length 74 to 85 mm.
19904. Tawao River, Sibuko Bay vicinity, Borneo. September 30, 1909. Length 58 mm.

AMBASSIS BUROENSIS Bleeker

- Ambassis buroensis* BLEEKER, Nat. Tijds. Nederland. Indië, vol. 13, 1857, p. 79. Kajeli, Buru; Atlas Ichth. Ind. Néerland., vol. 8, 1876-77, p. 137, pl. (75) 353, fig. 5 (Sumatra, Bali, Buru).—WEBER, Zool. Ergebn. Reise Nederland. Ost. Ind., vol. 3, 1894, p. 408 (Tjenrana River, Pampanna, Celebes; Kupang, Timor); Semon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 263 (Amboina fresh waters).
- Ambassis buroensis* GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 226 (copied).—MARTENS, Preuss. Exp. Ost-Asien, vol. 1, 1876, p. 386 (Luzon; Kupang, Timor).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 11 (north Celebes).—ELERA, Cat. Fauna Filip., 1895, p. 469 (Luzon, Pasig, Manila).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 26,

1906 (1907), p. 18 (Cavite).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 255 (Aparri).—BEAUFORT, Bijdr. Dierk., Amsterdam, 1913, p. 113 (Mirdika River, Batu Merah River, Amboina; Kajeli, Buru).

Depth $2\frac{2}{5}$ to $2\frac{3}{5}$; head $2\frac{2}{5}$ to $2\frac{3}{5}$, width $2\frac{2}{5}$ to $2\frac{1}{2}$. Snout $4\frac{3}{4}$ to 5 in head from snout*tip; eye $2\frac{7}{8}$ to $3\frac{1}{8}$, greater than snout or interorbital; maxillary reaches slightly beyond front eye edge but not to pupil, expansion 4 in eye, length $2\frac{1}{2}$ to $2\frac{2}{3}$ in head from snout tip; teeth villiform, minute, in narrow bands in jaws, on vomer and palatines and narrow bands on tongue medially; interorbital $3\frac{1}{2}$ to 4, slightly convex; single postero-supraorbital spine, none below; preorbital edge with 6 spines, ridge with smaller serrae; lower ridge and edge of preopercle denticulate, upper ridge and edge entire, spine at angle of ridge little enlarged. Gill rakers 8+22, slender, lanceolate, much longer than gill filaments or $1\frac{7}{8}$ to 2 in eye.

Scales 11 or 12+11+4 of which last on caudal base, lateral line interrupted; 3 scales above lateral line, 8 below, 13 or 14 predorsal nearly midway in interorbital form median keel, 2 rows on cheek and preopercle flange naked; caudal with fine scales basally; basal scaly sheaths, one scale wide along dorsals and anals. Scales with 6 or 7 basal radiating striae; circuli very fine.

D. VII, I, 9, 1, second erect spine $1\frac{1}{8}$ to $1\frac{1}{2}$ in total head length, first ray 2 to $2\frac{1}{8}$; A. III, 9, 1, third spine $1\frac{2}{3}$ to 2; caudal $1\frac{1}{8}$ to $1\frac{1}{2}$, deeply forked, slender lobes sharply pointed; least depth of caudal peduncle $2\frac{1}{2}$ to $2\frac{2}{3}$; pectoral $1\frac{1}{4}$ to $1\frac{1}{2}$; ventral $1\frac{1}{2}$ to $1\frac{3}{4}$.

Pale brown generally; scales on back and upper surfaces dusted with dark brown dots marginally. Sides and lower surfaces with bright silvery white reflections. Median diffuse silvery white band from eye to caudal. Fins all pale or immaculate, except membrane between second and third dorsal spines which dusted with dusky behind second spine, but not black. Iris silvery white.

East Indies, Philippines. Very closely related to *Ambassis interrupta*, though distinguished by the pale second membrane of the spinous dorsal.

Six examples. Basut River, Canimo Pass, Luzon. June 15, 1909. Length 25 to 51 mm.

Nineteen examples. Batangas River, Luzon. June 7, 1908. Length 20 to 35 mm.

Two examples. Butauanan Island, east coast Luzon. June 12, 1909. Length 35 to 38 mm.

Seven examples. Caiholo River, Palawan Island. December 29, 1908. Length 28 to 32 mm.

Eleven examples. Capunuyupugan, Generale Island, east coast Mindanao Island. May 9, 1908. Length 38 to 55 mm.

Twenty-two examples. Cathalogan, Samar. April 16, 1908. Length 15 to 25 mm.

- Forty-six examples. Cebu dock, Cebu. September 5, 1909. Length 35 to 60 mm.
- Four examples. Estero, Sablayan Bay, Pandan Island, Mindoro Strait. December 13, 1908. Length 40 to 42 mm.
19359. Mahinog, Camiguin Island, between Leyte and Mindanao. August 3, 1909. Length 55 to 58 mm. 2 examples.
- 5517, 5525, 5528, 5531, 5532. Malabon market. August 8, 1908. Length 53 to 68 mm.
- One example. Malaga River, Leyte Island. July 30, 1909. Length 73 mm.
5558. Malatgao and Canina River, Palawan. April 4, 1909. Length 33 mm.
- One example. Mati, Pujada Bay, Mindanao. May 15, 1908. Length 53 mm.
- One example. Murcielagos Bay, Mindanao. August 20, 1909. Length 34 mm.
- One hundred eighteen examples. Nakoda Bay, Palawan Island. December 31, 1908. Length 41 to 58 mm.
- Six examples. Nato River, Lagonoy Gulf, east coast Luzon. June 17, 1909. Length 32 to 35 mm.
- One example. Nato River. June 18, 1909. Length 25 mm.
- Ten examples. Nanjan River, east Mindoro. June 5, 1908. Length 79 to 88 mm.
11935. Nonucan River, Camp Overton, Mindanao. August 6, 1909. Length 39 to 69 mm. 14 examples.
- One example. North end Endeavor Strait, Palawan Island. December 22, 1908. Length 72 mm.
- Two examples. Port Jamelo, Luzon. July 13, 1908. Length 19 to 26 mm.
- Seven examples. Port Jamelo, 2 miles up river, Luzon. July 13, 1908. Length 20 to 35 mm.
- Fourteen examples. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 39 to 53 mm.
- One example. Port San Vicente. November 14, 1908. Length 48 mm.
- Six examples. Pucot River, Mariveles, Manila Bay. January 29, 1909. Length 53 to 93 mm.
- 5400, 5402, 5403. Ragay River, Ragay Gulf, Luzon. March 10, 1909. Length 45 to 86 mm. 19 examples.
- Fifteen examples. River at Pasacao, Ragay Gulf, Luzon. March 9, 1909. Length 41 to 69 mm.
- Eighteen examples. River at Port Dupon, Leyte. March 17, 1909. Length 46 to 62 mm.
- Twenty-four examples. Santiago River, Pagapas Bay, Luzon. February 20, 1909. Length 45 to 92 mm.
5858. Small stream, San Roque, Leyte. July 29, 1909. Length 35 mm.
- Two examples. Tara Island, Mindoro Strait. December 15, 1908. Length 23 mm.
- Five examples. Amboina stream, Amboina, Dutch East Indies. December 5, 1909. Length 30 to 47 mm.
- Four examples. Sabatik Island, Borneo. October 1, 1909. Length 49 to 59 mm.
- One example. Gomomo Island, Pitt Passage. December 3, 1909. Length 38 mm.
- One example. Near (D. 5300) in seaweed, 20° 31' N., 115° 49' E., China Sea. August 8, 1908. Length 16 mm.
- One example. Dip net off Kowloon dock, vicinity of Hong Kong, China. August 19, 1908. Length 23 mm.
- Six examples. Dip net off Kowloon dock (skiff's side). August 22, 1908. Length 31 to 35 mm.

- Three examples. Electric light off Kowloon dock. September 8, 1908. Length 20 to 23 mm.
- Seventy-four examples. Dip net off Kowloon dock (ship's side). September 9, 1908. Length 11 to 25 mm.
- One hundred sixty-seven examples. Dip net off Kowloon dock (ship's side). September 12, 1908. Length 15 to 25 mm.
- One hundred eighty-five examples. Electric light Kowloon dock. September 14, 1908. Length 18 to 40 mm.

AMBASSIS GYMNOCEPHALUS (Lacépède)

- Lutjanus gymnocephalus* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 181, 216. Great Equinoxial Ocean (Indo-Pacific); vol. 3, 1801, pl. 23, fig. 3.
- Ambassis gymnocephalus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 8, 1876-77, p. 138, pl. (74) 352, fig. 3 (Sumatra, Pinang, Singapore, Bintang, Banka, Java, Madura, Bali, Celebes, Timor, Batjan, Buru, Amboina).—DAY, Fishes of India, pt. 1, 1875, p. 54, pl. 15, fig. 6 (Cochin); Fauna Brit. India, vol. 1, 1889, p. 489.—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1905, p. 501 (Baram, Borneo).—PELLEGRIN, Bull. Soc. Zool. France, vol. 30, 1905, p. 85 (Tonkin).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 71, 1907, p. 129 (Tamarida, Sokotra).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 217 (Djankar, north Java).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 71, 1927, p. 6 (Benkoelen, Sumatra).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 75 (Sigan and Orani, Philippines).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 644 (Natal coast).
- Priopis gymnocephalus* JORDAN and SEALE, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 780 (Negros).—SEALE, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 274 (Sandakan, Borneo).
- Ambassis dussumieri* CUVIER, Hist. Nat. Poiss., vol. 2, 1829, p. 181. Malabar.—VALENCIENNES, Hist. Nat. Poiss., vol. 6, 1830, p. 503 (Moluccas); vol. 9, 1833, p. 43 (Mauritius and Seychelles).—QUOY and GAIMARD, Voy. Astrolabe, Zool., 1834, p. 650, pl. 1, fig. 3 (Amboina and Celebes).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 225 (China).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 41 (Madras).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 19 (Zanzibar).—DAY, Fishes of Malabar, 1867, p. 16; Proc. Zool. Soc. London, 1870, p. 681 (Andamans).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 151 (Singapore).—ELERA, Cat. Fauna Filip., 1895, p. 467 (Cebu).—BEAUFORT, Bijdr. Dierk., Amsterdam, 1913, p. 113 (Njanjef and Majalibit Bay, Waigiu).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 166 (compiled).
- Chanda dussumieri* CANTOR, Cat. Malayan Fishes, 1850, p. 6 (Sea of Pinang).
- Priopis argyrozona* (KUHL) VALENCIENNES, Hist. Nat. Poiss., vol. 6, 1833, p. 503. No locality (Java).
- Ambassis vachellii* (not RICHARDSON) PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 255 (Pulo brani, Singapore).

Depth $2\frac{1}{2}$ to $2\frac{3}{5}$; head $2\frac{2}{3}$ to $2\frac{3}{4}$, width $2\frac{1}{2}$ to $2\frac{3}{5}$. Snout $4\frac{1}{2}$ to 5 in head measured from upper jaw tip; eye 3 to $3\frac{1}{8}$, greater than snout or interorbital; maxillary reaches opposite front eye edge, expansion 4 in eye, length $2\frac{4}{5}$ to 3 in head from snout tip; teeth extremely minute, barely evident in jaws and on vomer, apparently none on palatines or tongue; interorbital $3\frac{4}{5}$ to $4\frac{1}{8}$, slightly convex; usually 5 supraocular serrae, last largest; 5 or 6 serrae on each lower preorbital edge; lower preopercle ridge and edge serrate, hind edges of both

entire. Gill rakers $10+21$, finely lanceolate, $1\frac{1}{5}$ in eye; gill filaments $\frac{2}{5}$ gill rakers.

Scales 13 or $14+14$ to caudal base and 3 more on latter; 4 scales above lateral line, 6 below to lower section, 13 to 15 predorsal forming median keel to occiput, 2 rows on cheek and preopercular flange naked; caudal covered with small scales basally; dorsals and anals each with basal sheath of scales one row in width. Scales with 4 or 5 short basal radiating striae marginal; circuli moderate.

D. VII, I, 9, 1, second spine $1\frac{1}{5}$ to $1\frac{1}{4}$ in total head length, first ray 2 to $2\frac{1}{8}$; A. III, 9, 1, third spine $1\frac{2}{3}$ to $1\frac{3}{4}$; caudal $1\frac{1}{8}$ to $1\frac{1}{5}$, forked; least depth of caudal peduncle $2\frac{1}{2}$ to $2\frac{2}{3}$; pectoral $1\frac{1}{4}$ to $1\frac{2}{5}$; ventral $1\frac{1}{2}$ to $1\frac{2}{5}$.

Pale brown, pale or whitish below. Median silvery lateral band. Membrane between second and third dorsal spines dusky with age. Fins and iris all pale or whitish.

Socotra, Zanzibar, Natal, Mauritius, Seychelles, India, Andamans, Cochin, Tonkin, East Indies, Philippines, China. Many examples, we find, do not have the second membrane of the spinous dorsal and the hind caudal edge blackish. The second and third dorsal spines are variably subequal.

22467. Cavite and San Roque markets. June 27, 1908. Length 67 mm.

5519, 5530. Malabon market. August 8, 1908. Length 50 to 58 mm.

One example. Manila Bay. December 6, 1907. Length 65 mm.

One example. Manila Bay. December 7, 1907. Length 67 mm.

One example. Manila Bay. December 8, 1909. Length 53 mm.

4516. Manila Bay. December 9, 1907. Length 60 to 68 mm. 4 examples.

Seven examples. Manila Bay. December 11, 1907. Length 60 to 71 mm.

Seven examples. Manila Harbor. December 30, 1907. Length 55 to 65 mm.

Fifty-seven examples. Manila Harbor. December 31, 1907. Length 52 to 70 mm.

Seven examples. Manila Harbor. January 31, 1908. Length 55 to 67 mm.

Two examples. Manila Harbor. March 16, 1908. Length 61 to 75 mm.

19500, 19501. Manila market. December 12-18, 1909. Length 71 to 74 mm.

Eleven examples. Palawan. December 25, 1908. Length 49 to 63 mm.

Fifteen examples. Philippines. Length 55 to 60 mm.

19728. Tacloban market. July 25, 1909. Length 55 to 63 mm. 2 examples.

One example. Tara Island, Mindoro Strait. December 15, 1908. Length 15 mm.

AMBASSIS BATJANENSIS Bleeker

Ambassis batjanensis BLEEKER, Nat. Tijds. Nederland. Indië, vol. 9, 1855, p. 196. Batjan, in fresh water.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 225 (Amboyna).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 8, 1876-77, p. 138, pl. (76) 354, fig. 4 (Singapore, Java, Bali, Celebes, Sumbawa, Rottf, Batjan, Buru, Amboina).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 151 (Change River, Singapore).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 11 (Manila Bay).—WEBER, Zool. Ergebn. Reise Nederland. Ost Ind., vol. 3, 1894, p. 409 (Koinino River, Kupang, Timor); Semon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 263 (fresh waters Amboina).—ELERA, Cat. Fauna Filip., 1895,

p. 469 (Rio Pasig, Manila).—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 415 (Oba River, Halmaheira).

Ambassis vaivasensis JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 254, fig. 47. Vaivase River, Apia, Samoa.—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 32 (Samoa); Mem. Bishop Mus., vol. 10, 1928, p. 166 (Apia and Fiji?).

Depth $2\frac{3}{4}$ to $2\frac{4}{5}$; head $2\frac{1}{3}$ to $2\frac{3}{4}$, width $2\frac{1}{4}$ to $2\frac{1}{5}$. Snout $4\frac{1}{4}$ to $4\frac{2}{5}$ in head from snout tip; eye $2\frac{1}{3}$ to 3, much greater than snout or interorbital; maxillary reaches $\frac{1}{5}$ in eye, expansion 5, length $2\frac{2}{3}$ to $2\frac{7}{8}$ in head from snout tip; teeth very minute, in narrow bands in jaws, on vomer and palatines and narrow median band on tongue; interorbital $4\frac{1}{3}$ to $4\frac{2}{5}$, slightly convex; postero-supraorbital ridge with 1 or 2 serrae; lower preorbital edge with 7 or 8 serrae and nearly same number of less distinct ones on preorbital keel; lower preopercle edge and keel finely serrate, though serrae usually more numerous on former and broad triangular spine at angle of ridge usually moderate. Gill rakers 9 or 10 + 18 to 20, finely lanceolate, 2 to $2\frac{1}{5}$ in eye; gill filaments $\frac{3}{5}$ of gill rakers.

Scales 26 to 28 in lateral line to caudal base and 4 or 5 more on latter; 3 or 4 above, 7 below, 13 to 15 predorsal with median keel extending forward midway in interorbital, usually 2 rows on cheek though sometimes only a single row anteriorly; caudal more or less with fine scales over greater portion basally; broad basal scaly sheaths along dorsals and anal, usually one scale in width. Scales with 5 to 16 radiating short marginal striae; circuli moderate, more numerous apically.

D. VII, I, 9, I, second spine $1\frac{1}{4}$ to $1\frac{2}{5}$ in total head length, first ray $1\frac{1}{5}$ to $1\frac{7}{8}$; A. III, 9, I, to 10, I, third spine $1\frac{4}{5}$ to $2\frac{1}{5}$, first ray $1\frac{7}{8}$ to 2; caudal $2\frac{3}{5}$ to $2\frac{2}{3}$ in combined head and body to caudal base; least depth of caudal peduncle $2\frac{3}{5}$ to $2\frac{2}{3}$; pectoral $1\frac{1}{4}$ to $1\frac{1}{5}$; ventral $1\frac{2}{5}$ to $1\frac{2}{3}$.

Pale brown, scales on back all dusted broadly marginally with dusky. Median axial silvery white band from head to caudal base. Iris silvery white. Fins pale, rays of soft verticals more or less dusted with dull dusky terminally and membrane between second and third dorsal spines terminally dusky to blackish. Often preserved examples show each caudal lobe slightly darker medially.

East Indies, Philippines, Polynesia. We have united *Ambassis vaivasensis* Jordan and Seale with this species. Bleeker gives the predorsal scales as 17, a number usually a little greater than most of our specimens. Bleeker had, however, but 2 specimens 73 to 79 mm. long.

Twenty-one examples. Basut River, east Luzon. June 15, 1909. Length 40 to 98 mm.

Seven examples. Bito Lake, Abuyog, Leyte Island. July 26, 1909. Length 51 to 71 mm.

- Twenty-two examples. Cabugo River, Catanduanes Island, east coast Luzon. June 9, 1909. Length 35 to 63 mm.
- Nineteen examples. Caluagan River, Paluan Bay, Mindoro Strait. December 11, 1908. Length 17 to 57 mm.
- One example. Cotabato, Mindanao. No date. Length 8 mm.
- Fifty-nine examples. Duwaca River, Luzon. February 25, 1909. Length 58 to 120 mm.
22085. Isabel, Basilan Island. September 11, 1909. Length 74 mm.
- Thirty-two examples. Iwahig River and tributary, Puerta Princesa, eastern Palawan Island. April 4, 1909. Length 45 to 93 mm.
- 5635, 12309. Maagnas, Lagonoy Gulf, Luzon. June 17, 1909. Length 65 to 98 mm. 9 examples.
9575. Mahinog River, Camiguin Island, between Leyte and Mindanao. August 3, 1909. Length 50 to 95 mm. 9 examples.
- Sixty-four examples. Malaga River, Leyte. July 30, 1909. Length 58 to 105 mm.
- Four examples. Malinao River, Palawan. April 2, 1909. Length 57 to 79 mm.
- Seventeen examples. Nakoda Bay, Palawan. December, 1908. Length 56 to 72 mm.
- One example. Nakoda Bay. December 31, 1908. Length 67 mm.
23595. Nato River, Lagonoy Gulf, east coast Luzon. June 18, 1909. Length 47 to 79 mm. 7 examples.
21790. Nonuean River, Camp Overton, Mindanao Island. August 6, 1909. Length 40 to 70 mm. 37 examples.
- Fifty examples. Paluan River, Mindanao Island. December 11, 1908. Length 20 to 55 mm.
- Twenty-seven examples. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 40 to 81 mm.
- Eight examples. Pucot River, Mariveles, Manila Bay, Luzon. January 29, 1909. Length 40 to 69 mm.
- 5398, 5401. Ragay River, Ragay Gulf, Luzon. March 10, 1909. Length 75 to 78 mm.
5856. San Roque, Leyte Island. July 29, 1909. Length 50 mm.
8806. Santiago River, Pagapas Bay, Luzon. February 20, 1909. Length 67 to 88 mm. 6 examples.
19996. West coast Palaui Island, off northern Luzon. November 18, 1908. Length 67 mm.
- Fifty-three examples. Yan River, Tayabas, Marinduque Island. February 25, 1909. Length 38 to 113 mm.
21594. Yaua River, Legaspi, Albay Gulf, Luzon. June 7, 1909. Length 22 to 86 mm. 77 examples.
- Sixty-six examples. Zamboanga Canal. October 8, 1909. Length 45 to 72 mm.
- 23598 to 23602. Zamboanga River. October 9, 1909. Length 115 to 137 mm.
- Sixty examples. Uki Island, Bouro Island vicinity. December 9, 1909. Length 67 to 90 mm.
- Four examples. Uki River, Uki Island. December 9, 1909. Length 82 to 89 mm.

WHITLEYINA, new subgenus

Type.—*Ambassis wolffi* Bleeker.

Diagnosis.—Scales small, about 40 to 46 in lateral line to caudal base. Cheek with 7 rows of scales. Second erect dorsal and anal spines enlarged and prominent, former higher than soft dorsal.

(For Mr. Gilbert P. Whitley, zoologist of the Australian Museum.)

AMBASSIS WOLFFI Bleeker

- Ambassis wolffi* BLEEKER, Nat. Tijds. Ned. Indië, vol. 1, 1850, pp. 3, 9. Bandjermassing, Borneo.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 226 (copied).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 8, 1876–77, p. 133, pl. (47) 325, fig. 2 (Sumatra, Borneo, Celebes).—FOWLER, Proc. Acad. Nat. Sci. Phila., 1905, p. 500 (Baram, Borneo).
- Ambassis wolffi* ELERA, Cat. Fauna Filip., 1895, p. 469 (Samara, Borongan).
- Ambassis robustus* (SCHLEGEL) GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 222. Borneo.—STEINDACHNER, Arch. Zool. Anat. Fisiol., vol. 3, 1864, p. 197, pl. 4, fig. 1 (Celebes).—ELERA, Cat. Fauna Filip., 1895, p. 467 (Samara and Cebu).

Depth $2\frac{1}{4}$; head $2\frac{2}{5}$, width $2\frac{1}{4}$. Snout $4\frac{3}{4}$ in head from snout tip; eye 3, much greater than snout or interorbital; maxillary reaches $\frac{2}{5}$ in eye, expansion $2\frac{1}{4}$ in eye, length $2\frac{1}{5}$ in total head length; teeth fine, villiform, in narrow bands in jaws with few anterior slightly enlarged; vomer and palatines each with bands of very small teeth, none on tongue; interorbital $4\frac{2}{5}$, little convex; 6 or 7 postero-superior orbital serrae; lower preorbital edge with 10 or 11 serrae, ridge with 7 or 8 smaller serrae; lower preopercle ridge and edge serrate, spine at angle of ridge large and narrow. Gill rakers 10 + 17, finely lanceolate, $\frac{1}{2}$ of eye; gill filaments $\frac{2}{3}$ gill rakers.

Scales 44 in lateral line to caudal base and 4 more on latter; 6 scales above lateral line, 15 below, 27 predorsal with median keel forward to middle of interorbital, 7 rows on cheek to preopercle ridge; caudal largely covered with small scales, larger basally; dorsals and anals with rather broad basal scaly sheaths; patch of small scales on pectoral base. Scales with 4 to 6 basal radiating striae; circuli fine, especially so apically.

D. VII, I, 10, 1, second spine $1\frac{1}{3}$ in total head length, first ray $2\frac{1}{5}$; A. 9, 1 (abnormal), fourth ray $2\frac{3}{4}$; caudal $1\frac{1}{4}$, deeply forked; least depth of caudal peduncle $3\frac{1}{5}$; pectoral $1\frac{1}{4}$; ventral $1\frac{1}{4}$.

Back dull brown, sides and below white, shot with silvery, especially on opercle. Iris whitish. Apparently no white lateral band. Fins all pale brownish, due to sprinkling of dark dots. Spinous dorsal with membranes dusky terminally or marginally. Ventrals also dusky marginally.

Known only from the East Indies and Siam. Though reported from the Philippines no examples are in our collection. The above description is from the example 147 mm. long, obtained in Baram, British North Borneo, 1898; obtained by Dr. W. H. Furness, 3d, and now in the collection of the Academy of Natural Sciences of Philadelphia. According to Bleeker it reaches 203 mm. in length.

Family DULEIDAE

Body oblong, strongly compressed. Head moderate, compressed. Mouth large, protractile. Maxillary exposed, without supplemental bone. Teeth villiform, in bands in jaws, usually on vomer, palatines,

entopterygoids and ectopterygoids. Preorbital and preopercle denticulate. Opercle with 2 spines. Gill membranes separate. Gill rakers long, slender. Pseudobranchiae usually large. Branchiostegals 6. Vertebrae 25, of which 14 or 15 caudal. Scales large, ciliated or ctenoid. Lateral line complete, tubes straight and occupy front half of exposed scale surface. Dorsals joined at bases, spines 10 to 12, rays 9 to 16. Anal equally long as soft dorsal, spines 3, rays 10 to 16. Caudal emarginate. Pectoral obtusely pointed, rays 14 to 17, upper longest. Ventral behind pectoral base, fins close together and each with strong spine.

Fishes of moderate or small size, in the fresh and brackish waters of the tropical Indo-Pacific. The uniformly silvery species live in the sea and those marked with dark spots enter fresh water estuaries or rivers. Besides *Dules* a West African species has been described and placed in a separate genus, *Parakuhlia* Pellegrin 1913, on account of the presence of pseudobranchiae.

Nannoperca Günther (= *Paradules* Klunzinger 1872 = *Edelia* Castelnau 1873 = *Microperca* Castelnau 1873) is from the fresh waters of Australia, with interrupted lateral line and rounded caudal, and has doubtfully been placed in this family.

Genus DULES Cuvier

Dules CUVIER, Règne Animal, ed. 2, vol. 2, 1829, p. 117. Type *Centropomus rupestris* LACÉPÈDE, designated by FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 510.

Platysoma LIÉNARD, Proc. Zool. Soc. London, pt. 2, 1832, p. 112. Type *Holocentrus caudavittatus* LACÉPÈDE, monotypic.

Kuhlia GILL, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 48. Type *Perca ciliata* CUVIER, orthotypic.

Moronopsis GILL, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 236. Type *Dules taeniurus* CUVIER, orthotypic.

Paradules BLEEKER, Nederland. Tijdschr. Dierk., vol. 1, 1863, p. 257. Type *Dules marginatus* CUVIER, monotypic.

Moronophis (GILL) DAY, Fishes of India, pt. 1, 1875, p. 67. Type *Dules taeniurus* CUVIER. (Lapsus for *Moronopsis*.)

Platysoma (not LEACH 1817) SCUDDER, Nomenclator Zool., 1882, p. 252. Type *Holocentrus caudavittatus* LACÉPÈDE, as *Platysoma* SCUDDER proposed for *Platysoma* LIÉNARD.

Herops DE VIS, Proc. Linn. Soc. New South Wales, vol. 9, 1885, p. 392. Type *Herops munda* DE VIS, monotypic.

Boulengerina (not DOLLO 1886) FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 512. Type *Dules mato* LESSON, orthotypic.

Safale JORDAN, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 655. Type *Dules taeniurus* CUVIER, orthotypic.

Body well elevated. Eyes moderate. Mouth terminal, oblique. Chin moderately prominent. No canines. Preorbital and preopercle edges finely denticulate. Opercle without membranous lobe. Gill rakers 17 to 28 on lower branch of first arch. Scales 40 to 50 in longitudinal series. Lateral line complete. Dorsal and anal fins

each with basal scaly sheaths. Dorsal begins well before middle in body length. Caudal emarginate or forked.

Widely distributed in the Indo-Pacific. We accept *Dules* Cuvier 1829 as different from *Dulus* Viellot 1816 in birds, thereby eventuating the family name Duleidae. This case parallels our acceptance of *Halichoeres* Rüppell as different from *Halichoerus* Nilsson in seals. We may note that *Moronopsis* Gill was proposed with the genotype *Dules taeniurus* Cuvier, thus the unnecessary *Safrole* Jordan with the same genotype falls as an exact synonym.

ANALYSIS OF THE SPECIES

- a¹. *DULES*. Caudal fin immaculate or with a single black blotch on each lobe in the young, becoming broad black margin with age; body usually with dark spots; 16 to 19 gill rakers on lower branch of first arch; scales 40 to 45+4 or 5 in lateral line.
- b¹. Caudal slightly emarginate, lobes rounded; anal rays 10; maxillary reaches below middle of eye, or beyond with age-----*rupestris*
- b². Caudal more emarginate; anal rays 11 to 13; maxillary not or barely reaches middle of eye-----*marginatus*
- a². *MORONOPSIS*. Caudal fin with median black band and 2 broad black bands on each lobe; body without dark spots; 24 to 29 gill rakers on lower branch of first arch; scales 50 or 51+5 in lateral line; anal rays 10 or 11---*taeniurus*

DULES RUPESTRIS (Lacépède)

Centropomus rupestris LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 252, 273. Col de l'Isle de la Réunion.

Dules rupestris CUVIER, Hist. Nat. Poiss., vol. 3, 1829, p. 119 (Bourbon and Mauritius).—VALENCIENNES, Hist. Nat. Poiss., vol. 7, 1831, p. 477 (Mauritius).—GUÉRIN, Iconogr. Règne Animal, Poiss., 1829-38, p. 8, pl. 6, fig. 2 (Bourbon).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 268 (Fiji, Ovalau, Amboina, Mauritius).—PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 256 (Basey River, Samar; Burbuen River, Leyte); 1876, p. 437 (Mauritius).—GÜNTHER, Trans. Roy. Soc. London, vol. 168, 1879, p. 471 (Rodríguez).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 13 (Menado, Celebes; Siao, Sangi).—JATZOW and LENZ, Abh. Senckenberg. Naturf. Ges., vol. 21, 1889, p. 500 (Kokotoni, Zanzibar).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 150, pl. 41B, fig. 3.—WEBER, Senon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 262 (Amboina, fresh water).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 512 (Samoa and Tahiti).

Doules rupestris GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 24.

Kuhlia rupestris BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 36 (Zanzibar, Mauritius, Rodríguez, Pelew Islands, Ponapé, Amboina, Solomons, New Hebrides, Fiji, Tonga).—PFEFFER, Thierw. Ost Afrika, Fische, 1896, p. 3, fig.—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 255 (Vaisigano River above Apia).—SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 30, 1907, p. 242 (Zamboanga).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 264 (name only).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 254 (Mindoro Island).—GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol. 6, 1908-10, p. 214 (Umbilo River tidal, Durban).—REGAN, Proc. Zool. Soc. London, 1913, p. 375 (Indo-Pacific to Tuamotus).—BEAUFORT, Bijdr. Dierk., Amsterdam, 1913, p. 110 (Kajeli, Buru).—BOULENGER, Cat. Fresh Water Fishes Africa, vol. 3, 1915,

- p. 93, fig. 76 (Zanzibar, Mauritius, Rodriguez).—GILCHRIST and THOMPSON, Ann. Durban Mus., vol. 1, 1917, p. 321 (compiled).—JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 232 (Chatan, Ryukyu).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 8 (Guam), p. 32 (Samoa), p. 37 (Tahiti).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 495, pl. 21, fig. 1 (copied DAY), (Natal coast).—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 33, No. 2, June, 1927, p. 205, pl. 1, fig. 2 (Abulug; Kiangang; Batan; Pansipit River; Naubhan River; Parvis River; Ulot River; Concepcion; Cuyo; Anajawan and Cabalian; Oumaguete; Titunod River; Balabac; Gandasole, Bangtoli and Tagbili Rivers, Asturias; Tawi Tawi; Fiji).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 168 (Guam, Hawaii, Apia, Kusaie, Ebon Island).
- Moronopsis rupestris* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 121, pl. (61) 339, fig. 2 (Timor, Batjan, Buru, Amboina).
- Perca ciliata* (KUILL and VAN HASSELT) CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 52. Fresh waters of Bantam, Java.
- Percichthys ciliata* GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 62 (copied).
- Dules fuscus* CUVIER, Hist. Nat. Poiss., vol. 3, 1829, p. 118. Bourbon.—PETERS, Arch. Naturg., 1855, p. 238 (Anjoana Island, fresh water, Mozambique).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 268 (copied).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 22 (Johanna Island).—PETERS, Naturw. Reise Mossambique, Zool., 1868, p. 10.—MARTENS, Reisen Ost Afrika von der Decken, vol. 3, pt. 1, 1869, p. 141 (Mauritius).
- Dules guamensis* VALENCIENNES, Hist. Nat. Poiss., vol. 7, 1831, p. 474. Guam.—HOMBRON and JACQUINOT, Voy. Astrolabe et Zélée, Zool., vol. 3, 1853, p. 42, pl. 3, fig. 1 (type).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 269.—MACLEAY, Proc. Linn. Soc. New South Wales, vol. 8, 1883, p. 257 (fresh waters Normanby Island, New Guinea).
- Dules vanicolensis* VALENCIENNES, Hist. Nat. Poiss., vol. 7, 1831, p. 478. Vanicolo.—HOMBRON and JACQUINOT, Voy. Astrolabe et Zélée, Zool., vol. 3, 1853, p. 42, pl. 3, fig. 2 (type).
- Therapon unicolor* (not GÜNTHER) KNER, Sitz. Ber. Akad. Wiss. Wien, vol. 58, 1868, pt. 1, p. 300, pl. 2, fig. 4 (Kandavu, Fiji; Rockhampton, Queensland).
- Dules marginatus* (not CUVIER) DAY, Fishes of India, pt. 1, 1875, p. 67, pl. 18, fig. 1; Fauna Brit. India, vol. 1, 1889, p. 503, fig.
- Dules haswellii* MACLEAY, Proc. Linn. Soc. New South Wales, vol. 5, 1880, p. 350. Rockingham Bay, Queensland; ser. 2, vol. 1, 1886, p. 882 (Cairns).
- Dules haswelli* KENT, Great Barrier Reef, 1893, p. 282 (Brisbane River).
- Kuhlia rupestris hedleyi* OGILBY, Proc. Linn. Soc. New South Wales, vol. 22, 1897, p. 767. New Caledonia.

Depth $2\frac{3}{4}$ to 3; head $2\frac{1}{5}$ to 3, width $1\frac{1}{8}$ to $2\frac{1}{8}$. Snout $3\frac{3}{4}$ to 4 in head measured from snout tip; eye $3\frac{2}{5}$ to $3\frac{1}{5}$, greater than snout to subequal with age, subequal to slightly less than interorbital; maxillary reaches $\frac{2}{5}$ in eye, expansion $2\frac{3}{4}$, length $2\frac{1}{8}$ to $2\frac{1}{5}$ in head from snout tip; teeth in rather broad villiform bands in jaws, narrower ones on vomer and palatines and tongue toothless; interorbital 3 to $3\frac{1}{2}$, little convex; lower preorbital and preopercle edges finely serrate, though hind preopercle edge entire. Gill rakers 5 or 6 + 17 or 18, lanceolate, slender, twice gill filaments or $1\frac{1}{2}$ in eye.

Scales 37 to 39 in lateral line to caudal base and 4 to 6 more on latter; 5 above, 8 or 9 below, 10 or 11 predorsal, 4 rows across cheek to preopercle ridge, and flange scaleless; caudal base largely covered with small scales and dorsals and anals with basal scaly sheaths. Scales with 8 to 13 basal radiating striae, often with 1 or 2 incomplete auxiliaries; 58 to 110 apical denticles, with 5 to 9 transverse series of basal elements; circuli fine.

D. IX, I, 11, I, fourth spine $2\frac{1}{8}$ to $2\frac{1}{3}$ in total head length, first dorsal ray $1\frac{3}{5}$ to $1\frac{7}{8}$; A. III, 10, I, third spine $2\frac{1}{2}$ to $2\frac{3}{4}$, first anal ray $1\frac{7}{8}$ to 2; caudal $1\frac{1}{8}$ to $1\frac{1}{4}$, emarginate; least depth of caudal peduncle $2\frac{7}{8}$ to 3; pectoral $1\frac{7}{8}$ to 2; ventral $1\frac{3}{4}$ to $1\frac{7}{8}$.

Deep brown above with slightly darker band along each row of scales and band made up of dark basal spot on each scale. Sides below and under surface of body pale to whitish with silvery tint. Iris whitish with silvery. Spinous dorsal with brown shading. Soft dorsal with broad dark terminal area on front lobe, narrowing posteriorly. Each caudal lobe with broad subterminal blackish blotch, becoming more marginal with age. Soft vertical fins often with subbasal row of dark spots, frequently as several rows over fins with age.

Johanna Island, Zanzibar, Mozambique, Natal, Madagascar, Bourbon, Mauritius, Rodriguez, East Indies, Philippines, Riu Kiu, Queensland, Melanesia, Micronesia, Polynesia. Although Regan gives his maximum examples as 400 mm. we have not seen any so large. It is abundant in many of the islands of Oceania from whence we have examined many specimens. *Kuhlia caerulea* Regan and *Kuhlia sauvaigi* Regan are similarly mottled or speckled species but with shorter maxillaries.

13388 to 13390. Bito River, Abuyog, Leyte Island. July 26, 1909. Length 175 to 195 mm.

Four examples. Calugan River, 3 miles from mouth near Paluan Bay, Mindoro. December 11, 1908. Length 36 to 47 mm.

1700. Capitancillo, between Cebu and Leyte. March 18, 1909. Length 245 mm. (D. 5408).

10802, 13969. Isabel River, Basilan Island. September 11, 1909. Length 175 to 208 mm.

5816. Iwahig River and tributaries, Puerta Princesa, Palawan. April 4, 1909. Length 103 to 111 mm.

5900 to 5909, 19654, 19655. Malaga River, Hinunangan Bay, Leyte Island. July 30, 1909. Length 80 to 180 mm.

5554, 5562, 5564. Malatgas and Cannia River, Puerta Princesa, Palawan Island. April 4, 1909. Length 85 to 185 mm.

4905. Malinao River, Palawan. April 2, 1909. Length 90 to 182 mm.

One example. Pucot River near Mariveles, Manila Bay, Luzon. January 29, 1909. Length 155 mm.

5867 to 5869, 5877, 5880 to 5882. Small stream at San Roque, Leyte Island. July 29-30, 1909. Length 65 to 218 mm. 16 examples.

5632, 5633. Stream at Maagnas, Lagonoy Gulf, Luzon. June 17, 1909. Length 90 to 220 mm. 3 examples.

- 7644, 11702, 17221, 17223, 21590, 22119. Yaua River, Legaspi, Luzon. June 7, 1909. Length 85 to 230 mm.
18126. Amboina stream, Amboina, Dutch East Indies. December 5, 1909. Length 131 mm.
13561. Amboina stream. December 7, 1909. Length 149 mm.
13492. River Uki, Bocro Island. December 9, 1909. Length 213 mm.

DULES MARGINATUS Cuvier

- Dules marginatus* CUVIER, Hist. Nat. Poiss., vol. 3, 1829, p. 116, pl. 52. Java.—VALENCIENNES, Hist. Nat. Poiss., vol. 7, 1831, p. 474 (Vanicolo).—HOMBRON and JACQUINOT, Voy. Astrolabe et Zélée, Zool., vol. 3, 1853, p. 41, pl. 3, fig. 3 (Java).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 268 (Java, Amboina, Fiji); Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 24 (Sumatra, Java, Amboina, Fiji, Society Islands, Bonham Islands, Gilbert Islands, Hawaii, Polynesia).—DAY, Fishes of India, pt. 1, 1875, p. 67 (part).—GÜNTHER, Trans. Roy. Soc. London, vol. 168, 1879, pp. 470, 471 (Rodriguez).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 153 (Palaboen, Java).—DAY, Fauna Brit. India, vol. 1, 1889, p. 503 (part).—WEBER, Zool. Ergebn. Reise Nederland. Ost. Ind., vol. 3, 1894, p. 407 (Koinino River, Kupang, Timor; Amparang River, Balangnipa, Celebes); Semon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 262 (Amboina, fresh water).—REUVENS, Notes Leyden Mus., vol. 16, 1895, p. 149 (Java, Borneo, Buru, Amboina, East Indies).—PERUGIA, Ann. Mus. Civ. Stor. Nat. Genova, ser. 2, vol. 16, 1896, p. 48 (Mentawai Island).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 512 (Tahiti).
- Kuhlia marginata* BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 38 (Java, Manado, Amboyna, Misol, Solomons, Bonham Island, Savaii, Fiji, Viti Levu, Tahiti).—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 413 (Ternate, Halmahera, Rivers Patani and Oba).—JORDAN and EVERMANN, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 340 (Kotosko, Formosa).—ISHIKAWA, Proc. Dep. Nat. Hist. Tokyo Imp. Univ., vol. 1, 1904, p. 9, pl. 3, fig. 1 (Wakanoura and Tojimgawa, Idzu).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 255 (Vaisigano River, Apia).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 264 (name only).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 254 (Rio Baco, Mindoro).—JORDAN and THOMPSON, Proc. U. S. Nat. Mus., vol. 41, 1912, p. 525 (Kotosho, Apia, Mindoro).—BEAUFORT, Bijdr. Dierk., Amsterdam, 1913, p. 110 (Kajeli, Bouru; Batjan; Buli, Halmahera; Lam-lam, North Waigiu; Eme and Tuba Rivers, West Ceram).—REGAN, Proc. Zool. Soc. London, 1913, p. 378 (Malay Archipelago and South Pacific; types of *Dules leuciscus* Jenyns).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 194 (Dammer Island).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 32 (Samoa), p. 37 (Tahiti).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 71, 1927, p. 14 (Tahiti).—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 33, No. 2, June 1927, p. 203, pl. 1, fig. 3 (Bataan Province; Pansipit River; Batangas; Pinamalayan; Pigaa and Arimbay Rivers; San José de Buenavista; Dumaquete; Lazi; Cagayan de Misamis; Kolambagan and Malabang Spring; Balabac; Davao; Saub River; Gandasole River; Malum River).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 168 (Tahiti, Hilo, Maui, Hawaiian Islands, Locality?, Honolulu markets).
- Dules mato* LESSON, Voy. Coquille, Zool., vol. 2, pt. 1, June 18, 1830, p. 223. Matawai River, Venus Point, Tahiti.—HOMBRON and JACQUINOT, Voy.

Astrolabe et Zélée, Zool., vol. 3, 1853, p. 43, pl. 3, fig. 4 (type).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1906, p. 512 (part).

Dules malo VALENCIENNES, Hist. Nat. Poiss., vol. 7, 1831, p. 479 (type).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 270 (copied).—GILCHRIST, Marine Invest. South Africa, vol. 1, 1902, p. 705 (compiled).

Kuhlia malo BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 40 (South Africa; Viti Levu; Tahiti).—JORDAN and EVERMANN, Bull. U. S. Fish. Comm., vol. 23, pt. 1, 1903 (1905), p. 207 (part).—SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 242 (Zamboanga).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 264 (name only).—KENDALL and GOLDSBOROUGH, Mem. Mus. Comp. Zool., vol. 26, 1911, p. 280, pl. 2, fig. 2 (Tipaerui River, Papeete, Society Islands).—BOULENGER, Cat. Fresh Water Fishes Africa, vol. 3, 1915, p. 96, fig. 78 (South Africa).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 496 (South African Seas).—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 33, No. 2, June, 1927, p. 202 (compiled).

Dules maculatus VALENCIENNES, Hist. Nat. Poiss., vol. 7, 1831, p. 475. Celebes.

Kuhlia maculata KENDALL and GOLDSBOROUGH, Mem. Mus. Comp. Zool., vol. 26, 1911, p. 281, pl. 3, fig. 1 (Kusaie, Carolines).

Dules leuciscus JENYNS, Voy. Beagle, Zool., 1842, p. 17. River Matuvui, Tahiti.

Moronopsis ciliatus (not *Perca ciliata* CUVIER) BLEEKER, Atlas Ichth. Ind, Néerland., vol. 7, 1873-76, p. 120, pl. (38) 316, fig. 1, pl. (46) 324, fig. 2 (Java, Bali, Sumatra, Nias, Celebes, Batjan, Buru, Amboina, Ceram).

Dules papuensis MACLEAY, Proc. Linn. Soc. New South Wales, vol. 8, 1883, p. 257. Goldie River in fresh water, New Guinea.

Depth $2\frac{3}{4}$ to $2\frac{7}{8}$; head $2\frac{3}{4}$ to 3, width $2\frac{1}{8}$ to $2\frac{1}{4}$. Snout $3\frac{7}{8}$ to 4 in head from upper jaw tip; eye $2\frac{2}{3}$ to $3\frac{1}{4}$, greater than snout or interorbital; maxillary reaches $\frac{1}{3}$ in eye, expansion 3 to $3\frac{1}{2}$ in eye, length $2\frac{1}{4}$ to $2\frac{1}{3}$ in head from snout tip; teeth fine, villiform, in broad bands in jaws, narrower ones on vomer and palatines, none on tongue; interorbital $3\frac{1}{8}$ to $3\frac{3}{5}$, broadly convex; lower preorbital and preopercle edges denticulate and preopercle flange with striae. Gill rakers 9 + 18, lanceolate, slender, twice long as gill filaments or $1\frac{3}{4}$ in eye.

Scales 38 to 40 in lateral line to caudal base and 4 or 5 more on latter; 6 scales above lateral line, 9 below, 11 or 12 predorsal, 5 rows across cheek to preopercle ridge and flange scaleless; caudal base largely covered with small scales and dorsals and anals with basal scaly sheaths. Scales with 10 to 12 marginal basal striae, mostly radiating, often with 1 to 3 incomplete auxiliaries; 54 to 58 apical denticles, with 8 or 9 transverse series of basal elements; circuli fine.

D. X, 11, I, or 12, I, fifth spine $1\frac{2}{3}$ to 2 in total head length, second ray $1\frac{3}{5}$ to $1\frac{7}{8}$; A. III, 12, I, third spine $2\frac{1}{8}$ to $2\frac{1}{4}$, first ray $1\frac{3}{4}$ to $1\frac{4}{5}$; least depth of caudal peduncle $2\frac{2}{3}$ to $2\frac{3}{4}$; caudal $1\frac{1}{3}$ to $1\frac{1}{5}$; pectoral $1\frac{2}{5}$ to $1\frac{3}{5}$; ventral $1\frac{2}{5}$ to $1\frac{2}{5}$.

Back light brown, lower surfaces paler to whitish, whole body with silvery white sheen. Upper surfaces of body or sides above marked with many large deep brown spots, which also extend on soft vertical

fins, at least basally, though most noticeable on caudal. Fins light brown. Spinous dorsal dark basally and median area broadly pale or whitish. Apex of soft dorsal dusky, also margin, then median dark band. Anal with several dark blotches anteriorly. Paired fins pale, front ventral edge narrowly white, then anterior submarginal dark streak. Iris silvery white.

South Africa, Rodriguez, East Indies, Formosa, Japan, Philippines, Melanesia, Micronesia, Polynesia.

10661, 10662. Basud River, Luzon, fresh water. June 15, 1909. Length 210 to 220 mm.

5563. Batangas market. June 7, 1908. Length 186 mm.

19264. Busbus Point, Siasi Island, between Jolo and Tawi Tawi. September 20, 1909. Length 160 mm.

Two examples. Calugan River, 3 miles from mouth near Paluan Bay, Mindoro. December 11, 1908. Length 32 to 47 mm,

23737 to 23739. Dumaco River, Luzon. February 25, 1909. Length 90 to 100 mm.

5813 to 5815, 5817 to 5823. Iwahig River and tributaries, Puerto Princesa, Palawan. April 4, 1907. Length 80 to 139 mm. 16 examples.

11385, 11388, 11389. Joni River, Tayabas Island. February 25, 1909. Length 129 to 144 mm.

9576, 9578 to 9580. Malinog River, Camiguin Island. August 3, 1909. Length 65 to 167 mm. 40 examples.

5552, 5553, 5555 to 5561. Malatgas and Cannia Rivers, Puerto Princesa, Palawan. April 4, 1909. Length 111 to 185 mm.

4906, 4907. Malinao River, Palawan Island. April 21, 1909. Length 38 to 170 mm. 5 examples.

14460, 17938, 19262, 19263, 19266, 19267. Nianauga River, Cebu. August 25 1909. Length 30 to 200 mm. 8 examples.

11678 (1111). Mariveles Bay, Manila Bay. January 30, 1909. Length 175 mm.

22137. Murcielagos Bay, Cascade River, Mindanao. August 20, 1909. Length 135 mm.

6348, 5342 to 5346, 11925 to 11934, 11968, 11969, 21155, 21789. Nonucan River, Camp Overton, Mindanao. August 6, 1909. Length 69 to 212 mm. 37 examples.

11438. Pucot River, Mariveles Bay, Manila Bay. January 29, 1909. Length 65 to 184 mm.

5870 to 5876, 5878 to 5879. Small stream at San Roque, Leyte Island. July 29, 1909. Length 95 to 175 mm. 20 examples.

7266 to 7268, 12308, 12315, 12316. Stream at Maagnas, Lagonoy Gulf, Luzon. June 17, 1909. Length 28 to 202 mm. 32 examples,

5636. Stream at Maagnas. April 4, 1909. Length 98 mm.

7645 to 7648, 11701, 17222, 17224 to 17226, 21591, 21592, 22117, 22120, 22121. Yaua River, Legaspi. June 7, 1909. Length 70 to 215 mm. 15 examples.

9231 to 9233, 21006. Zamboanga River. October 9, 1909. Length 130 to 200 mm.

13560, 13562 to 13567, 13901 to 13905, 13908 to 13921, 18120, 18122 to 18125, 18127 to 18129, 18237, 18238, 18241, 18243 to 18245. Amboina Stream, Amboina, Dutch East Indies. December 5 to 7, 1909. Length 62 to 196 mm.

9736 to 9738, 13493, 21217. River Uki, Bouro Island. December 9, 1909. Length 73 to 212 mm. 17 examples.

19903. Tawao River, Sibuko Bay, Borneo. September 30, 1909. Length 111 mm.

DULES TAENIURUS Cuvier

- Dules taeniurus* CUVIER, Hist. Nat. Poiss., vol. 3, 1829, p. 114. Java.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 267 (Chinese Sea).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 47 (Tahiti).—DAY, Proc. Zool. Soc. London, 1870, p. 682 (Andamans).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 13 (Siao, Sangi).—GORGOZA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 284 (Manila Bay).—JATZOW and LENZ, Abh. Senckenberg. Naturf. Ges., vol. 21, 1889, p. 500 (Zanzibar).—ELERA, Cat. Fauna Filip., 1895, p. 471 (Luzon, Manila Bay).
- Doules taeniurus* GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 24.
- Moronopsis taeniurus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 119 (Java, Sumatra, Buru); vol. 8, 1876-77, pl. (67) 345, fig. 5.
- Kuhlia taenivira* BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 39 (Socotra, Zanzibar, Seychelles, Port Natal, South Africa, Mauritius, Laccadives, China, Tahiti).—WAITE, Rec. Austral. Mus., vol. 5, pt. 3, 1904, p. 164 (Lord Howe Island).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 255 (Tutuila, Samoa).—REGAN, Journ. Linn. Soc. London, vol. 12, ser. 2, 1907, p. 228 (Praslin, Seychelles Group).—SNODGRASS and HELLER, Proc. Washington Acad. Sci., vol. 6, 1905, p. 366 (Galapagos).—JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 39, 1906, p. 698 (Tanegashima, Japan).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 71, pt. 1, 1907, p. 127 (brooks of Kalausiyé; Teich Lebine at Kor Garrieh, Sokotra).—GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol. 6, 1908-11, p. 149 (Natal).—BOULENGER, Cat. Fresh Water Fishes Africa, vol. 3, 1915, p. 95 (South Africa and Port Natal).—McCULLOCH, Austral. Zool., vol. 1, pt. 7, 1919, p. 48, pl. 19, fig. 175a (Port Jackson).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 71, 1927, p. 14 (Tahiti).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 496 (East London and Natal coast).—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 33, No. 2, June 1927, p. 200, pl. 1, fig. 1 (Guam; Tanegashima Island, Japan).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 171 (Marcus Island, Faté, Apia, Johnston Island, Marshall Islands, Apiang).
- Boulengerina taenivira* JORDAN and THOMPSON, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 522 (Tanegashima, Okinawa, Misaki, Samoa, Lord Howe Island, off Western Mexico).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 413 (Misaki and Tanegashima).
- Safole taenivira* SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 497 (Okinawa).—JORDAN and RICHARDSON, Mem. Carnegie Mus., vol. 6, No. 4, 1914, p. 248 (Misaki).
- Perca argentea* (not LINNAEUS) BENNETT, Fishes of Ceylon, 1830, pl. 22. Ceylon at Fort Point de Galle.
- Dules argenteus* KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 730 (Two Brothers Island and Koseir, Red Sea).—GÜNTHER, Journ. Mus. Godeffroy, vols. 2-3, pts. 5-6, 1874, p. 25, pl. 19, fig. c (Tahiti and Kingsmill Islands).—DAY, Fishes of India, pt. 1, 1875, p. 67, pl. 18, fig. 2 (Andamans); Fauna Brit. India, vol. 1, 1889, p. 504.—WAITE, Proc. Linn. Soc. New South Wales, ser. 2, vol. 9, 1894, p. 217 (Lord Howe Island).
- Moronopsis argenteus* KLUNZINGER, Fische Roth. Meer., 1884, p. 25.
- Dules bennetti* BLEEKER, Verh. Batav. Genootsch., No. 8, vol. 25, 1853, p. 32 (on BENNETT).—PETERS, Monats. Akad. Wiss. Berlin, 1855, p. 238 (Mozambique).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 270 (no locality, probably South Africa?).—JATZOW and LENZ, Abh. Senckenburg. Naturf. Ges., vol. 21, 1889, p. 500 (Zanzibar; Majunga, West Madagascar).

Kuhlia arge JORDAN and BOLLMAN, Proc. U. S. Nat. Mus., vol. 12, 1889, p. 159. Chatham Island, Galapagos.

Kuhlia sternecki STEINDACHNER, Sitz. Ber. Akad. Wiss. Wien, vol. 107, pt. 1, 1898, p. 461, pl. Gulf of Alsabah.

Depth $2\frac{3}{5}$ to $2\frac{1}{5}$; head 3 to $3\frac{1}{4}$, width $2\frac{1}{8}$ to $2\frac{3}{4}$. Snout $3\frac{2}{3}$ to $4\frac{1}{2}$ in head measured from snout tip; eye $2\frac{3}{4}$ to $3\frac{1}{8}$, greater than snout, greater than interorbital in young to subequal with age; maxillary reaches about $\frac{1}{4}$ in eye, expansion 3 in eye, length $2\frac{1}{2}$ to $2\frac{3}{5}$ in head from snout tip; teeth finely conic, in moderate bands in jaws, patch on vomer and small patch on front of each palatine, tongue toothless; interorbital 3 to $3\frac{1}{8}$, broadly convex; lower preorbital and preopercle edge minutely serrate, hind preopercle edge entire and preopercular flange striate. Gill rakers 12 + 24, lanceolate, slender, $1\frac{3}{4}$ in eye.

Scales 50 or 51 in lateral line to caudal base and 5 more on latter; 6 scales above, 12 below, 12 predorsal forward to occiput, 5 rows on cheek to angle of preopercle ridge, preopercle flange naked; caudal largely covered with fine scales, larger basally; dorsals and anals each with moderate basal sheath of small scales. Scales with 8 to 12 basal radiating striae; 71 to 75 apical denticles with about 14 or 15 transverse series of basal elements; circuli fine.

D. IX, I, 10, 1, fifth spine $1\frac{3}{4}$ to $1\frac{1}{2}$ in total head length, first ray $1\frac{2}{3}$ to $1\frac{7}{8}$; A. III, 11, 1, third anal spine $2\frac{3}{4}$ to 3, first ray $1\frac{7}{8}$ to $2\frac{1}{3}$; caudal $2\frac{1}{5}$ to $3\frac{1}{5}$ in combined head and body to caudal base; least depth of caudal peduncle $2\frac{1}{5}$ to $2\frac{2}{3}$ in total head length; pectoral $1\frac{2}{3}$ to $1\frac{1}{2}$; ventral $1\frac{3}{5}$ to $1\frac{3}{4}$.

Back brown, sides and below silvery white. Iris whitish. Dorsals and anals pale, with obscure dark scattered dots. In young membranes of spinous dorsal black terminally. Upper anterior angle of soft dorsal also black in young. At all ages caudal whitish, black median band from base and each lobe with broad oblique, greatly contrasted blotch though leaving tip of each lobe white. Paired fins and anal usually pale or whitish. In young also bases of dorsals more or less narrowly dark.

Red Sea, Zanzibar, Mozambique, Natal, South Africa, Madagascar, Mauritius, Réunion, Laccadives, Seychelles, Ceylon, Andamans, East Indies, Philippines, Riu Kiu, China, Japan, New South Wales, Melanesia, Micronesia, Polynesia, Galapagos and Revillagigedos Islands. This interesting species is easily known among all the others of its genus by the strongly contrasted caudal fin, which is marked by a median black band and two inclined broad black bands on each caudal lobe.

20652. Port Ciego, Balabac. January 3, 1909. Length 45 to 59 mm. 6 examples.

Eight examples. Silino Island, tidepool. August 10, 1909. Length 25 to 43 mm.

Family SERRANIDAE

Body oblong, more or less compressed, dorsal and ventral profiles usually not exactly alike. Caudal peduncle of moderate depth. Mouth moderate to large, not very oblique. Premaxillaries protractile and wide maxillary usually not slipping its whole length into sheath formed by preorbital, which mostly narrow. Each premaxillary branch with hind expansion internal to maxillary. Supplemental maxillary present or absent. Teeth conic or pointed, in bands in jaws and usually present in bands on vomer and palatines. Nostrils double each side. Preopercle edge usually more or less serrate, rarely entire. Opercles usually with one or two terminal flat spines. Gill membranes separate, free from isthmus. Gills 4, slit behind last. Gill rakers long or short, usually stiff, armed with teeth. Pseudobranchiae present, large. Branchiostegals 5 to 8. Lower pharyngeals rather narrow, with pointed teeth, separate. Skull without conical spines and usually without well developed cavernous structure. Subocular shelf present. No suborbital stay. Vertebrae typically 24, of which 14 caudal, number sometimes increased, never over 35. All or most ribs attached on transverse processes, when latter develop. Front vertebrae without transverse processes. Air vessel present, usually small and adherent to wall of abdomen. Stomach coecal, with few or many pyloric appendages. Intestine short, as usual in carnivorous fishes. Scales adherent, moderate or small, usually, but not always ctenoid. Cheeks and opercles always scaly. Lateral line single, not extending on caudal fin. Dorsal spines mostly stiff, 2 to 15. Soft dorsal with 10 to 30 rays. Anal rather short, soft rays 7 to 12, spines when present, always three, sometimes absent. Caudal usually with 17 principal rays. Pectoral well developed, with narrow base, rays branched. Ventral with spine and 5 rays, thoracic, normally developed and without distinct axillary scale.

A large family of marine fishes in all warm seas, a few living in tidal waters where brackish or even fresh. All are carnivorous and among the most valued of food fishes. About 70 genera known. We unite the Latidae, Moronidae, Oligoridae, Nipponidae, Epinephelidae, Serranidae, and Plesiopidae of Jordan, all as the present family. In such a greatly diversified group further subdivision into subfamilies will doubtless be found necessary, though at present those of the Philippine region fall as we set forth below. Many of the species are little known and many are very variable, especially with age. In a few of these cases we have attempted to illustrate a few of the more striking variations by means of the accompanying pen sketches.

ANALYSIS OF THE GENERA

- a*¹. Two distinct or separated dorsal fins, or only slightly joined at their bases; preopercle edge at least partly serrated or spiniferous.
- b*¹. *LATINAE*. Opercle ends in a single spine; scales moderate or small, 40 to 70; anal rays 8 or 9; pectorals and ventrals subequal.
- c*¹. Lower edge of opercle with spines or serrae; tongue smooth; lower gill rakers 16 or 17. *Lates*
- c*². Lower edge of preopercle entire; tongue with patch of fine, short teeth; lower gill rakers 11 to 13. *Psammoperca*
- b*². Opercle ends in 3 spines; scales rather or very small, 50 to 100; anal rays 9 to 13; pectorals small.
- d*¹. Head more or less rugose striate above and on muzzle; soft dorsal and anal fins scaleless; pectoral shorter than ventral.
- e*¹. *BELONOPERCAE*. Head attenuated, pike-like; scales about 50; D. VI-I, 10; A. I, 8. *Belonoperca*
- e*². *DIPLOPRIONINAE*. Head deep, blunt in profile; scales over 100; D. VIII-15; A. III, 13. *Diploprion*
- d*¹. Head without rugose striae on cranium or muzzle; soft dorsal and anal fins more or less scaly basally; paired fins subequal or pectoral longer than ventral.
- f*¹. Dorsal spines 5 to 9; preopercle edge entire or minutely or irregularly serrate; maxillary with supplemental bone; scales 45 to 50; anal rays 7 or 8.
- g*¹. *CHORISTISTINAE*. Two separate dorsals, not joined at base; lower jaw without 2 forward projecting denticles at tip; lower gill rakers 13; caudal peduncle deep. *Chorististium*
- g*². *MALAKICHTHYINAE*. Two dorsals, joined narrowly at their basal intersection; lower jaw with 2 forward projecting denticles at tip; lower gill rakers 23; caudal peduncle slender. *Malakichthys*
- f*². *MORONINAE*. Dorsal spines 11 or 12; body elongated; preopercle edge minutely serrate; scales small, 100 or more (larger in extralimital genera).
- h*¹. Maxillary with supplemental bone; preopercle without spine at angle; scales small, about 100 in lateral line *Lateolabrax*
- h*². Maxillary without supplemental bone; preopercle with strong spine at angle; scales very small, 160 in lateral line. *Nipho-*

*a*². Dorsal fin undivided or single, never divided deeply or to base.

*i*¹. SERRANINAE (=EPINEPHELINAE Authors). Lateral line single, extends medianly along side of tail; opercle with spines; ventral with spine and 5 soft rays.

*j*¹. Anal with 3 well developed spines.

*k*¹. Maxillary with distinct supplemental bone.

*l*¹. Jaws without depressible hinged teeth; front nostril with fringed tentacle.-----Centrogenys

*l*². Inner teeth of jaws depressible, hinged.

*m*¹. Hind nostril not slitlike; usually some teeth caninelike.

*n*¹. Dorsal spines 6 to 8; anal spines feeble; size moderate or small.-----Plectropomus

*n*². Dorsal spines 9, rays 13 to 15; 3 anal spines, strong, rays 7 or 8; size small.

*o*¹. One or 2 curved canines on each side of mandible besides those in front of each jaw.----Variola

*o*². No curved canines on side of mandible.-----Cephalopholis

*n*³. Dorsal spines 11, strong (rarely vary 9 or 10).

*p*¹. Anal with 3 well developed spines.

*p*². Tubes of lateral line simple, without radiating ridges; size moderate or small.

*q*¹. Palatines toothed.-----Serranus

*q*². Palatines toothless.-----Anyperodon

*r*². Each tube of lateral line with 4 to 6 strong radiating ridges; interorbital very wide, cranium short; dorsal spines low; size very large.-----Promicropops

*m*². Hind nostril long vertical slit; no canine teeth; dorsal spines 10.-----Cromileptes

*k*¹. ANTHINAE. Maxillary without supplemental bone; canines present but no depressible teeth; lateral line extends close along back, often angulated.-----Anthias

*j*². GRAMMISTINAE. Anal spines usually absent; scales very small and more or less imbedded in skin; opercle and preopercle with spines; dorsal spines 2 to 7.-----Grammistes

*i*². PLESIOPINAE. Two lateral lines, upper lost on upper surface of caudal peduncle or under last dorsal rays and lower extends along side of tail medially; ventral with spine and 4 soft rays.

*r*¹. Body elongate; fins low, membranes of spinous dorsal with edges deeply notched.-----Plesiops

*r*². Body short; fins higher, soft verticals elevated or elongate, all rounded, membranes of spinous dorsal entire.-----Callopletiops

Genus LATES Cuvier

Lates CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 88. Type *Perca nilotica* GMELIN, designated by GILL, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 52.

Pseudolates ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1877, p. 262. Type *Pseudolates cavifrons* ALLEYNE and MACLEAY, monotypic.

Body compressed, elongate. Mouth large, protractile. Maxillary exposed, with supplementary bone. Bands of villiform teeth in jaws, on vomer, palatines and ectopterygoids; no teeth on tongue. Hind preopercle edge serrated, straight spine at angle and few on lower edge, anterior antrorse. Opercle ends in spine. Gill membranes separate. Pseudobranchiae very small or absent. Gill rakers long. Branchiostegals 7. Vertebrae 25, of which 13 caudal. Scales moderate or rather large, finely ctenoid. Head partly scaled. Dorsal and anal in more or less distinct scaly sheath, soft portion covered with scales. Lateral line complete, extends on base or nearly to end of caudal fin; tubes straight, occupy basal half of scale exposure. Dorsal spines 7 or 8 and 1 before, 10 to 12 rays, fins subequal. Anal spines 3, rays 8 or 9, short. Caudal rounded. Pectoral rays 16 or 17, short, symmetrical, rounded. Ventral with strong spine and produced basal scale below pectoral base, fins close together.

Nile, Niger, Senegal; estuaries and coasts of southeast Asia and north Australia.

LATES CALCARIFER (Bloch)

Holocentrus calcarifer BLOCH, Naturg. Ausländ. Fische, vol. 4, 1790, p. 100, pl. 244. Japan.—WALBAUM, Artedi Piscium, vol. 3, 1792, p. 640 (on BLOCH).—FORSTER, Fauna Indica, 1795, p. 16.—LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 341, 384 (Japan).

Lates calcarifer CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 100 (on BLOCH).—RICHARDSON, Ichth. China, Japan, 1846, p. 222 (Canton).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 68 (India, Ganges, China).—DAY, Fishes of Malabar, 1865, p. 2; Proc. Zool. Soc. London, 1865, p. 5 (Cochin).—GÜNTHER, Proc. Zool. Soc. London, 1870, p. 824 (Fitzroy River).—DAY, Fishes of India, pt. 1, 1875, p. 7, pl. 1, fig. 1.—O'SHAUGHNESSY, Zool. Record, 1875 (1878), pisces, p. 9.—CASTELNAU, Proc. Linn. Soc. New South Wales, vol. 3, 1878, p. 42 (Norman and Fitzroy Rivers).—KLUNZINGER, Sitz. Ber. Akad. Wiss. Wien, vol. 80, pt. 1, 1879, p. 342 (Cleveland Bay, Queensland).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 8 (north Celebes).—DAY, Fishes of India, Suppl., 1888, p. 779; Fauna Brit. India, vol. 1, 1889, p. 440, fig. 139.—THURSTON, Notes Pearl Fisher. Manaar, 1890, p. 91 (Tuticorin and Panban).—KENT, Great Barrier Reef, 1893, pp. 280, 396 (north of Keppel Bay).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 363 (Western India, Madras, Ganges, Burma, China, Amoy, Malay Archipelago, Sarawak, Fitzroy River).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 457 (Mindoro and Calapan).—KENT, Naturalist in Australia, 1897, pp. 169 (Fitzroy in Queensland to Ashburton in West Australia).—STEAD, Fishes of Australia, 1906, p. 96

- (West Australia and Queensland).—SEALE, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 275 (Sandakan, Borneo).—WEBER, Siboga Exp., vol. 57 Fische, 1913, p. 215 (Makassar).—ZUGMAYER, Abh. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 9 (Mekran and Oman).—FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines); Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 275 (San Fernando, Orani, Orion, Philippines); Mem. Bishop Mus., vol. 10, 1928, p. 171 (compiled).
- Latris calcarifer* KENT, Great Barrier Reef, 1893, pl. 43, fig. 1.
- Plectropoma calcarifer* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 109 (Java, Madura, Singapore, Banka, Borneo, Celebes); vol. 8, 1876-77, pl. (45) 322, fig. 3.
- Plectropomus calcarifer* JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 19 (Cavite).
- Plectropoma calcariferum* EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 78 (Zamboanga).
- Perca calcar* SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 89. Japan.
- Holocentrus heptadactylus* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 344, 389. No locality.
- Lates heptadactylus* CANTOR, Cat. Malayan Fishes, 1850, p. 1 (Pinang Sea, Malay Peninsula, Singapore).
- Coius vacti* BUCHANAN-HAMILTON, Fishes of Ganges, 1822, pp. 86, 369, pl. 16, fig. 28. All mouths of Ganges River.
- Lates nobilis* CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 96, pl. 13. Pondicherry.—RICHARDSON, Ichth. China, Japan, 1846, p. 222 (Canton, China).
- Pseudolates carifrons* ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1877, p. 262, pl. 3. Torres Straits or the coast of New Guinea.
- Lates darwiniensis* MACLEAY, Proc. Linn. Soc. New South Wales, vol. 2, 1878, p. 345. Port Darwin, Queensland.

Depth 3 to $3\frac{1}{6}$; head $2\frac{3}{4}$ to $2\frac{7}{8}$, width $3\frac{1}{8}$ to $3\frac{1}{5}$. Snout $4\frac{3}{4}$ to $5\frac{3}{4}$ in head from snout tip; eye $7\frac{1}{2}$ to 8, $1\frac{2}{3}$ to $1\frac{1}{2}$ in snout, equals interorbital; maxillary extends $\frac{1}{2}$ to $\frac{3}{4}$ an eye diameter beyond eye, expansion $\frac{7}{8}$ to slightly greater than eye diameter, length $2\frac{1}{3}$ to $2\frac{2}{5}$ in head from snout tip; teeth villiform, in bands in jaws, on vomer, palatines and tongue; interorbital $7\frac{1}{2}$ to $8\frac{1}{8}$; hind preopercle edge finely serrated, though serrae inconspicuous with age, 3 or 4 spines along lower edge and larger spine at angle; opercular spine little smaller than spine at preopercle angle. Gill rakers 4 + 16, lanceolate, longer than gill filaments and equal eye.

Scales 45 to 56 in lateral line to caudal base and 7 to 9 more on latter; 6 or 7 above, 10 to 14 below, 27 or 28 predorsal though not quite extending opposite eye; 10 rows extend across cheek to preopercle ridge, flange scaleless; muzzle including maxillary, infraorbitals and interorbital naked; small scales extend over most soft rayed fins. Scales with 9 or 10 basal radiating striae; 98 to 315 rather obsolete apical denticles with about 32 to 50 transverse series of basal elements; circuli fine.

D. VII, I, 10, I, or 11, I, third spine 2 to $2\frac{1}{3}$ in total head length, third ray $2\frac{1}{5}$ to $2\frac{1}{3}$; A. III, 8, I, third spine $4\frac{1}{5}$ to $5\frac{1}{2}$, third ray $2\frac{1}{5}$

to $2\frac{1}{2}$; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, rounded behind; least depth of caudal peduncle $2\frac{1}{2}$ to $2\frac{4}{5}$; pectoral 2 to $2\frac{1}{8}$; ventral $1\frac{3}{4}$ to $1\frac{1}{5}$.

Back brown, lower sides and under surface pale to whitish, with silvery white sheen. Lower side of head silvery white. Iris brown. Vertical fins all brown, paired fins paler.

Oman, India, Burma, East Indies, Philippines, China, Japan, North Australia.

7209, 7210. Aparri market. November 19, 1908. Both 610 mm.

1427. Macassar. December 26, 1909. Length 455 mm.

Genus PSAMMOPERCA Richardson

Psammoperca RICHARDSON, Zool. Voy. Erebus and Terror, Ichth., 1846, p. 115.

Type *Psammoperca datnioides* RICHARDSON = *Labrax waigiensis* CUVIER, monotypic.

Cniodon MÜLLER and TROSCHEL, Horae Ichth., vol. 3, 1849, p. 21. Type

Cniodon chinensis MÜLLER and TROSCHEL, monotypic.

Hypopterus GILL, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 50. Type

Psammoperca macroptera GÜNTHER, monotypic.

Body compressed. Mouth rather large, protractile. Maxillary exposed, with supplemental bone. Small, crowded, granular teeth in jaws and on vomer, palatines and ectopterygoids. Tongue with small patch of teeth posteriorly. Preopercle with hind edge serrated, strong spine at angle and lower edge entire. Opercle ends in spine. Gill membranes separate. Pseudobranchiae very small or absent. Gill rakers long. Branchiostegals 7. Vertebrae 25, of which 14 caudal. Scales moderate, denticulated. Head scaly. Dorsals and anals move in scaly sheath, soft fins covered with scales. Lateral line complete, extends nearly to end of caudal fin; tubes strait and confined to basal half of exposed part of scale. Dorsal with 7 spines, soft fin with spine and 12 to 15 rays, spinous fin shorter than soft fin. Anal with 3 spines and 9 to 13 rays. Caudal rounded. Pectoral rays 16, subsymmetrical, rounded. Ventral with strong spine and scaly pointed flap at base, below pectoral base, fins close together.

Bengal Bay to China Sea and North Australia.

PSAMMOPERCA WAIGIENSIS (Cuvier)

Labrax waigiensis CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 83. Waigiu.—LESSON, Voy. Coquille, Zool., vol. 2, pt. 1, 1830, p. 237 (Offack Bay, Waigiu).

Psammoperca waigiensis GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 69 (Australia, Victoria, China).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 13 (Hong Kong and Manila).—GÜNTHER, Ann. Mag. Nat. Hist. London, ser. 4, vol. 10, 1872, p. 426 (Australia, Victoria, New South Wales, Torres Straits, Manila, China).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873–76, p. 108, pl. (28) 306, fig. 2 (Singapore, Bintang, Banka, Java, Madura, Borneo, Celebes, Waigiu, Manila).—KLUNZINGER,

- Sitz. Ber. Akad. Wiss. Wien, vol. 80, pt. 1, 1879, p. 343 (Endeavour River, Queensland).—MACLEAY, Proc. Linn. Soc. New South Wales, vol. 5, 1880, p. 307 (North Australia).—DAY, Fauna Brit. India, vol. 1, 1889, p. 440 (Madras).—KENT, Great Barrier Reef, 1893, pp. 281, 369 (Queensland).—WEBER, Semon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 622 (Thursday Island, Queensland).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 457 (Luzon, Calayan, Marinduque, Samar).—JORDAN and EVERMANN, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 340 (Formosa).—PELLEGRIN, Bull. Soc. Zool. France, vol. 30, 1905, p. 83 (Baie d'Along, Tonkin).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 78 (Bulan).—SEALE, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 275 (Sandakan, Borneo).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 215 (Makassar; Tual; Pepela Bay, Rotti).—McCULLOCH, Rec. West Austral. Mus., vol. 1, pt. 2, 1912, p. 215 (Port Hedland).—FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines).—TANAKA, Fig. Deser. Fishes Japan, vol. 32, July 1, 1922, p. 602, pl. 147, fig. 407 (Kochi).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 274 (Philippines); Mem. Bishop Mus., vol. 10, 1928, p. 171 (compiled).
- Psammoperca vaigiensis* BOULENGER, Cat. Fishes Brit. Mus., vol. 1, 1895, p. 365 (Victoria River, Australia, Hammond Island, Cebu, China Sea, Borneo, Singapore, Madras coast, Ceylon).
- Psammoperca datnioides* RICHARDSON, Ichth. Voy. Erebus and Terror, 1846, p. 116, pl. 57, figs. 1-2. Australia.
- Cnidon chinensis* MÜLLER and TROSCHEL, Horae Ichth., vol. 3, 1849, p. 21. Manila.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 68 (copied).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 8 (North Celebes, Manila Bay, Cebu).—GORGOZA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 281 (Manila Bay; Cebu).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 457 (Luzon, Manila, Lingayen, Pangasinan, Cebu).

Depth $2\frac{2}{3}$ to $3\frac{1}{8}$; head $2\frac{2}{3}$ to $2\frac{3}{4}$, width $2\frac{1}{3}$ to $2\frac{4}{5}$. Snout $3\frac{2}{5}$ to $3\frac{3}{4}$ in head from snout tip; eye $4\frac{1}{10}$ to $5\frac{1}{8}$, $1\frac{1}{10}$ to $1\frac{1}{2}$ in snout, greater than interorbital; maxillary reaches $\frac{3}{5}$ to $\frac{2}{3}$ in eye, expansion $1\frac{2}{5}$ to $1\frac{3}{4}$, length $2\frac{1}{5}$ to $2\frac{2}{5}$ in head from snout tip; teeth villiform, in bands in jaws, on vomer, palatines and tongue; interorbital $6\frac{1}{8}$ to $6\frac{3}{4}$, convex; hind preopercle edge denticulate, with strong spine at angle, lower edge entire. Gill rakers 7 + 13, lanceolate, $1\frac{2}{3}$ in eye; 5 upper and 6 lower rudimentary.

Scales 43 to 46 in lateral line to caudal base and 13 to 17 more on latter; 5 above, 8 or 9 below, 23 or 24 predorsal, 9 or 10 rows across cheek to preopercle angle; fin bases broadly with fine scales; maxillary naked, also muzzle and front of interorbital. Scales with 9 or 10 basal radiating striae; 75 to 118 apical denticles, with 6 or 7 transverse series; circuli fine.

D. VII, I, 12, 1, third spine $1\frac{7}{8}$ to $2\frac{1}{3}$ in total head length, seventh ray $1\frac{7}{8}$ to 2; A. III, 8, 1, third spine $3\frac{1}{2}$ to 4, fourth ray $1\frac{7}{8}$ to $2\frac{1}{10}$; caudal $1\frac{1}{5}$ to $1\frac{1}{3}$, convex behind; least depth of caudal peduncle $2\frac{1}{3}$ to $2\frac{1}{2}$; pectoral 2 to $2\frac{1}{8}$; ventral $1\frac{2}{3}$ to $1\frac{4}{5}$.

Back brown, below pale or at least under surface usually little lighter in small examples. Fins all uniform brownish. Lateral line

little darker than general color. Iris brown. Young with dark horizontal streak along lower edge of infraorbital and back along cheek to angle of preopercle. Upper half of head till nearly level with lower eye edge dark and in contrast with pale color of lower surface of head.

Ceylon, India, East Indies, Philippines, Tonkin, China, Formosa, Japan, Queensland, New South Wales.

7235. Busbus Point, Siasi Island, between Jolo and Tawi Tawi Group. September 20, 1909. Length 355 mm.

11771. Iloilo Market, Panay. June 2, 1908. Length 224 mm.

14346. Limbones Cove, Manila Bay. February 8, 1909. Length 225 mm.

12522. Malcochin Harbor, Linapacan Island. December 19, 1908. Length 238 mm. Gullet swollen, due to large isopod crustacean on tongue.

5342. Nonucan River, Camp Overton, Mindanao. August 1909. Length 225 mm.

21645, 21646. Port Jamelo, Luzon. July 13, 1908. Length 137 to 145 mm.

6178. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 318 mm.

4717. San Miguel Harbor, Ticao Island. April 21, 1908. Length 345 mm.

A646. Simaluc Sibi Sibi Island. September 23, 1909. Length 328 mm.

1411. Tana Keke Island, Flores Sea. December 21, 1909. Length 243 mm.

4788 (D. 5517). 21° 36' N., 117° 27' E., China Sea, vicinity Formosa. Length 240 mm. (Though the record book gives D. 5317, as we find D. 5517 between D. 5316 and D. 5318 in "Dredging and Hydrographic Records of the U. S. Fisheries Steamer *Albatross*," Bur. Fisher. Document, No. 741, 1910, p. 44, we assume D. 5517 to have been intended.)

BELONOPERCA,¹⁰ new genus

Type.—*Belonoperca chabanaudi*, new species.

Body rather short, robust, compressed. Head large, with elongated or attenuated muzzle. Eye moderate, little before middle in head. Mouth protractile, lower jaw protruding. Maxillary large, well expanded, with long slender supplemental bone. Teeth fine, villiform, in bands in jaws, on vomer and palatines, none on tongue. Tongue long, slender, free. Interorbital moderate. Cranium, preorbital and maxillary more or less finely rugose striate. Preopercle denticulate. Opercle with 3 spines. Gill rakers moderate. Scales finely roughened, uniformly small. Caudal basally and over rays covered with minute scales, fins otherwise naked. Lateral line complete. Two dorsals, entirely separate, first with 7 strong spines and rayed fin with weak spine and 10 rays. Anal with 3 slender, weak spines and 7 rays. Caudal truncate or slightly emarginate. Pectoral much shorter than ventral.

One species, of small size. Greatly suggestive, in a superficial way, of the American *Centropomus*.

Diagnosis.—Known by its pikelike appearance, separated dorsals and reduced soft dorsal and anal rays.

¹⁰ Βελος arrow; πέριχη perch; with reference to its contour suggestive of an arrowhead.

BELONOPERCA CHABANAUDI,¹¹ new species

Depth $3\frac{1}{3}$ to $3\frac{1}{3}$; head $2\frac{1}{2}$ to $2\frac{3}{5}$, width 3 to $3\frac{1}{8}$. Snout 3 in head from snout tip; eye $5\frac{1}{4}$ to $5\frac{1}{3}$, $1\frac{3}{4}$ to $1\frac{1}{2}$ in snout, subequal with interorbital; maxillary reaches $\frac{3}{5}$ to $\frac{2}{3}$ in eye, expansion $1\frac{1}{2}$ in eye, length 2 to $2\frac{1}{8}$ in head from snout tip; teeth villiform, in bands in jaws, on vomer and palatines; tongue slender, toothless; preopercle edge strongly denticulate, ridge entire, distinct; opercular spines 3, equidistant, median most posterior; interopercle and subopercle denticulate. Gill rakers 6+15, lanceolate, robust, greater than gill rakers or equal $1\frac{1}{2}$ in eye.

Scales 66 to 68 in lateral line to caudal base and 6 or 7 more on latter; 11 scales above lateral line, 34 below, 25 to 27 predorsal, 12 rows across cheek to preopercle ridge. Fins all scaleless, except cau-

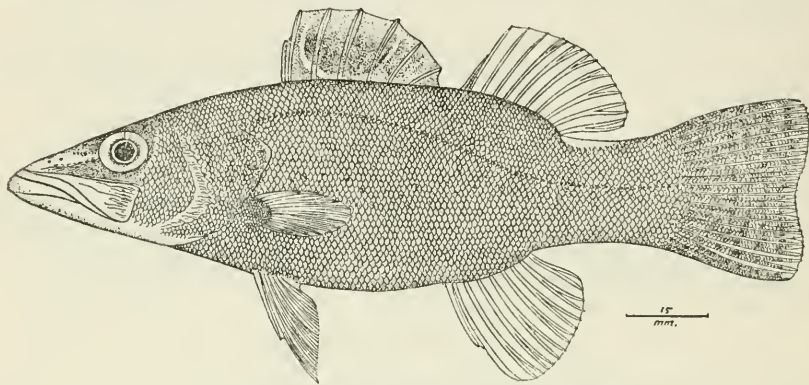


FIGURE 4.—*BELONOPERCA CHABANAUDI*, NEW SPECIES.

dal which with 2 rows at least. Front surface of ventrals with small scales on each ray. Scales with 5 or 6 basal radiating striae; apical denticles 20 to 22, each with 4 or 5 transverse series of basal elements; circuli moderate.

D. VIII-IV, 7, 1, fourth spine 3 to $3\frac{1}{2}$ in total head length, first divided ray $2\frac{3}{5}$; A. II, 8, 1, spines very slender, short, and close, third ray $2\frac{1}{4}$ to $2\frac{2}{5}$; caudal $1\frac{1}{2}$ to $1\frac{2}{3}$, truncate; least depth of caudal peduncle $2\frac{3}{5}$ to $2\frac{3}{4}$; pectoral $2\frac{3}{4}$; ventral $2\frac{1}{8}$ to $2\frac{1}{2}$.

Dark ecru or chocolate brown, with obscure, ill-defined, variable dark spots on side of head, middle of side of body, and on rays of caudal fin. Iris brown. Spinous dorsal dusky, with obscure, large, black ocellus with irregular border of dull blue gray, apparently in front and behind. Membranes of other vertical fins pale buff, rays darker, especially those of caudal which with dark spots. Pectoral dull brown. Ventral more or less dusky. Narrow buff saddle, little evident in profile, on front of caudal peduncle above behind soft dorsal.

Known only from the types obtained in the East Indies.

¹¹ For Paul Chabanaud, of the Muséum national d'histoire naturelle Paris.

9709. Una Una Road, Binang Unang, Gulf of Tomini, Celebes. November 17, 1909. Length 148 mm. (Type, Cat. No. 89982 U.S.N.M.) 2047.
 13627. Birabirakan Island, off Borneo. December 31, 1909. Length 148 mm. (Paratype.)

Genus DIPLOPRION Cuvier

Diploprion (KÜHL and VAN HASSELT) CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 137. Type *Diploprion bifasciatum* (KÜHL and VAN HASSELT) CUVIER, monotypic; Règne Animal, ed. 2, vol. 2, 1829, p. 137.

Body short, deep, much compressed, back elevated. Head large, deep. Mouth large, protractile. Maxillary with large supplemental bone. Jaws, vomer, and palatines with bands of villiform teeth, no canines. Tongue smooth. Hind preopercle edge without conspicuous serrae, angle obtuse, lower limb with 8 to 10 strong serrae. Opercle with 3 strong spines. Gill rakers moderate, tips knoblike. Branchiostegals 7. Vertebrae 25, of which 13 caudal. Scales small, 100 or more in lateral line. Cheeks and opercles scaled, rest of head, jaws, and chin bare. Opercle, preopercle, infraorbitals, and suborbital regions more or less rugose. Dorsal spines 8, strong rays 14 to 16. Anal spines 2 or 3, rays 12 to 14. Caudal rounded. Pectoral rounded. Ventral with strong spine, below pectoral base and fins close together.

East Indies, China, Japan.

DIPLOPRION BIFASCIATUM Cuvier

Diploprion bifasciatum (KÜHL and VAN HASSELT) CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 137, pl. 21. Java.—SCHLEGEL, Fauna Japon., pt. 1, 1842, pl. 2a (Simabara Bay, Nagasaki).—RICHARDSON, Ichth. China, Japan, 1846, p. 221 (Canton).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 174 (China, Hong Kong, Japan, Moluccas, India).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 29 (Java, Hong Kong).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 71 (Batu, Singapore, Bintang, Java, Celebes, Buru, Amboina, Timor); vol. 8, 1876-77, pl. (68) 346, fig. 3.—DAY, Fishes of India, pt. 1, 1875, p. 28, pl. 9, fig. 2.—MACLEAY, Proc. Linn. Soc. New South Wales, vol. 2, 1878, p. 346 (Port Darwin).—KLUNZINGER, Sitz. Ber. Akad. Wiss. Wien, vol. 80, pt. 1, 1879, p. 310 (Port Darwin).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 150 (Canton).—STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, Math.-Nat. Kl., vol. 47, 1883, p. 234 (Kagoshima).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 10 (Macassar, South Celebes; Ternate).—NYSTRÖM, Svensk Vet. Akad. Handl., vol. 13, pt. 4, 1887, No. 4, p. 8 (Nagasaki).—DAY, Fauna Brit. India, vol. 1, 1889, p. 462.—KENT, Great Barrier Reef, 1893, p. 369 (Queensland).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 464 (Luzon, Zambales, Pangasinan).—ISHIKAWA and MATSUURA, Prelim. Cat. Fishes Tokyo Mus., 1897, p. 56.—McCULLOCH, Biol. Res. Endeavour, vol. 2, pt. 3, 1914, p. 102 (West Australia, Cape York, China).

Diploprion bifasciatum MARTENS, Preuss. Exp. Ost-Asien, vol. 1, 1876, p. 386 (Nagasaki Bay).—JORDAN and SNYDER, Annot. Zool. Japon., vol. 3, 1901, p. 73 (Yokohama, Kagoshima, Nagasaki).—JORDAN and SEALE, Proc.

U. S. Nat. Mus., vol. 29, 1905, p. 521 (Hong Kong); Proc. Davenport Acad. Sci., vol. 10, 1905, p. 9 (Hong Kong).—JORDAN and RICHARDSON, Proc. U. S. Nat. Mus., vol. 37, 1910, p. 427, fig. 2 (Hakata, Wakanoura, Nagasaki).—IZUKA and MATSUURA, Cat. Zool. Spec. Tokyo Mus., 1920, p. 154 (Kagoshima).

Depth $2\frac{1}{8}$ to $2\frac{1}{4}$; head $2\frac{3}{8}$, width $2\frac{1}{4}$ to $2\frac{3}{5}$. Snout 3 to $3\frac{1}{3}$ in head from snout tip; eye $3\frac{1}{5}$ to $4\frac{3}{4}$, $1\frac{1}{10}$ to $1\frac{3}{5}$ in snout, greater than interorbital in young to subequal with age; maxillary reaches $\frac{2}{5}$ to $\frac{1}{2}$ in eye, expansion 1 to $1\frac{1}{4}$ in eye, length $1\frac{7}{8}$ to 2 in head from snout tip; teeth villiform, in bands in jaws, on vomer and palatines; interorbital $4\frac{4}{5}$ to 5; preopercle limb rugose, edge minutely serrate, though serrae better developed on lower edge; opercular spines strong, equidistant, median largest; subopercle serrate; pre-orbital rugose, also humeral arch. Gill rakers 9 + 21, lanceolate, equal gill filaments or $1\frac{1}{2}$ in eye.

Scales 93 to 95 in lateral line to caudal base and 9 to 11 more on latter; tubes 68 to 70 in lateral line to caudal base and 1 to 5 more on latter; 17 or 18 scales above, 43 to 46 below, 18 or 19 predorsal, 11 rows across cheek; fins scaleless, except caudal base; maxillary naked. Scales with 6 or 7 basal radiating striae; 5 or 6 long apical denticles, in 2 to 4 transverse series; circuli moderately fine.

D. VIII, I, 13, 1, third spine $1\frac{2}{5}$ to $1\frac{2}{3}$ in total head length, fourth ray $1\frac{2}{5}$ to $1\frac{4}{5}$; A. II, 11, 10, 1, second spine $6\frac{1}{5}$ to 7, third ray $1\frac{3}{5}$ to $1\frac{2}{3}$; caudal $1\frac{1}{4}$ to $1\frac{2}{5}$, convex behind; least depth of caudal peduncle $2\frac{1}{3}$ to $2\frac{2}{5}$; pectoral $1\frac{2}{5}$ to $1\frac{2}{3}$; ventral $2\frac{1}{3}$ to $2\frac{2}{5}$ in combined head and body to caudal base.

Light yellowish. Two broad blackish brown cross bands; first nearly wide as eye passes from just before spinous dorsal obliquely to eye, then across cheek widening below and fading, though in some examples extends as pale on breast; broad dusky brown band from spinous dorsal down to vent and front of anal base. Ventral dusky brown. Fins otherwise uniform yellowish.

India, East Indies, Philippines, China, Japan, Queensland, West Australia. Our specimens all agree in having greatly longer ventrals than shown in Jordan and Richardson's figure.¹² In most of our material the ventral is nearly twice as long as pectoral. Several of our East Indian examples differ a little from those taken in the Philippines in having light colored ventrals.

4. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 135 mm.

7289. Gigoso Point, Samar. July 28, 1909. Length 114 mm.

5152, 7306, 7307. Jolo market. March 6, 1908. Length 170 to 178 mm.

17519 to 17521. Lampinigan Island, south coast of Zamboanga. September 11, 1909. Length 125 to 140 mm.

14579. Maculabo Island, east coast of Luzon. June 14, 1909. Length 145 mm.

16410, 16422. Mansalay, Mindoro. June 4, 1908. Length 130 to 150 mm.

¹² Proc. U. S. Nat. Mus., vol. 37, 1910, p. 428, fig. 2.

16695. Palaui Island, off northern Luzon. November 18, 1908. Length 155 mm.
 22863. Togian Bay, Gulf of Tomini, Celebes. November 7, 1909. Length 130 mm.
 19946, 22684. Gane Road, Gillolo Island. December 1, 1909. Length 125 to 136 mm.
 15333. Hokuko, Formosa. January 29, 1910. Length 183 mm.

Genus CHORISTISTIUM Gill

Chorististium GILL, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 15. Type *Liopropoma rubre* POEY, orthotypic.

Body moderately long, compressed. Head moderate. Eye moderate, anterior. Mouth large, lower jaw protruding. Maxillary with supplemental bone. Teeth villiform, in bands in jaws, on vomer and palatines but none on tongue. Opercle with 2 or 3 flat spines. Preopercle entire or very slightly serrate. Preorbital narrow. Gill rakers moderate. Scales rather large, about 40 to 50. Soft dorsal and anal, also caudal, scaly basally. Lateral line arched anteriorly, complete. Dorsals well separated, spines 5 to 8 and soft dorsal with or without spine and 9 to 12 rays. Anal spines 3, rays 8. Caudal truncate or very slightly emarginate. Pectoral longer than ventral.

Cuba, Samoa. This diagnosis is framed chiefly from the type of *Chorististium susumi* Jordan and Seale in the United States National Museum and Poey's account of the genotype *Liopropoma rubre* which is said to be but 80 mm. long, and besides a third species we describe as new.

ANALYSIS OF THE SPECIES

- a¹. Warm brown generally with seven deep brown well-defined narrow longitudinal dark bands; fins uniform.....**susumi**
 a². Brown with six very pale longitudinal bands, converge narrowly on head toward eye; soft dorsal and anal each with large black ocellus marginally.
swalesi

CHORISTISTIUM SUSUMI Jordan and Seale

Chorististium susumi JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 256, fig. 48. Apia, Samoa.—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 172 (copied).

Depth $3\frac{1}{2}$; head $2\frac{2}{5}$ to $2\frac{2}{3}$, width $2\frac{1}{3}$ to $2\frac{3}{4}$. Snout $4\frac{4}{5}$ to $5\frac{1}{4}$ in head from snout tip; eye $4\frac{1}{5}$ to $4\frac{1}{4}$, greater than snout, greater than interorbital to subequal with age; maxillary not quite reaching opposite hind eye edge, expansion $1\frac{3}{4}$ in eye, length $2\frac{1}{4}$ to $2\frac{2}{5}$ in head from snout tip; broad bands of fine villiform teeth in jaws, on vomer and palatines, none on tongue; interorbital $4\frac{4}{5}$ to $7\frac{1}{5}$, level; preopercle ridge finely serrate. Gill rakers 2+9, lanceolate, little longer than gill filaments or $1\frac{3}{4}$ in eye; 4 or 5 more as rudiments both above and below.

Scales 46 in lateral line to caudal base and 5 more on latter; 5 scales above and 15 below, 28 predorsal forward near end of snout, 9 rows on cheek to preopercle edge; soft vertical fins and ventrals scaly over basal half of each fin at least and pectoral with narrower

scaly basal area. Head largely covered with small scales and about 5 rows transversely on maxillary. Lateral line well arched, especially below spinous dorsal, tubes all large, well exposed and simple. Scales with 11 basal nearly parallel striae; 58 to 60 small apical denticles, in 2 series transversely; circuli very fine.

D. VI-I, 1, 10, 1, third spine $2\frac{1}{2}$ to $2\frac{7}{8}$ in total head length, first branched ray $2\frac{1}{5}$; A. III, 8, 1, second spine $3\frac{1}{8}$, third ray $2\frac{1}{5}$; caudal $1\frac{3}{4}$, very slightly emarginate behind, resulting lobes slightly rounded; least depth of caudal peduncle $2\frac{3}{5}$; pectoral $1\frac{1}{2}$; ventral 2.

Warm brown generally, with 7 deep brown well-defined longitudinal dark bands, converging on head toward eye. Fins all uniform pale brownish. Iris brownish. Known previously only from the type. We have 2 other specimens which now establish the range of the species from the Philippines to Samoa.

(616). Baganga Bay, eastern Mindanao. May 13, 1908. Length 82 mm.

9391. Paluan Bay, Mindoro. December 11, 1908. Length 44 mm.

51738, U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 78 mm. (Type.)

CHORISTISTIUM SWALESI,¹³ new species

Depth 3; head $2\frac{1}{3}$ to $2\frac{3}{5}$, width 2 to $2\frac{1}{2}$. Snout $4\frac{2}{5}$ to $4\frac{1}{2}$ in head from snout tip; eye 4 to $4\frac{2}{5}$, subequal with snout, greater than interorbital; maxillary reaches $\frac{2}{3}$ to $\frac{4}{5}$ in eye, expansion $1\frac{1}{4}$ in eye, length $2\frac{1}{3}$ to $2\frac{2}{5}$ in head from snout tip; teeth in villiform bands in jaws, on vomer and palatines; interorbital 5 to $5\frac{1}{2}$ in head, scarcely convex; preopercle edge with rather weak serrae; opercle spines 3, small, distinct. Gill rakers 8 + 18, lanceolate, little longer than gill filaments or half of eye.

Scales 42 in lateral line to caudal base and 3 more on latter; 5 scales above, 17 below, about 30 predorsal forward to nostril, 11 or 12 rows across cheek to hind preopercle angle; bases of soft vertical fins broadly scaly; maxillary expansion with 4 or 5 transverse rows of scales; snout, preorbital and front interorbital naked. Scales with 12 basal radiating striae; 42 to 48 short apical denticles, in 3 series transversely; circuli rather fine.

D. VIII, I, 9, 1 or 10, 1, third spine $2\frac{3}{5}$ to $2\frac{2}{3}$ in total head length, first branched ray $2\frac{1}{3}$; A. III, 8, 1, second spine $2\frac{1}{2}$ to $2\frac{3}{5}$, first ray 2 to $2\frac{1}{2}$; caudal $1\frac{3}{4}$ to $1\frac{4}{5}$, truncate; least depth of caudal peduncle $2\frac{3}{5}$ to 3; pectoral $1\frac{1}{3}$ to $1\frac{1}{2}$; ventral $1\frac{4}{5}$.

Brown generally, little paler below. Median pale line from interorbital to spinous dorsal. From head six pale bands longitudinally, upper 5 extend from upper and posterior edge of eye, diverge and broaden on body though none wide as dark interspaces, with third and fourth converging on caudal toward middle of its hind edge. Iris pale. Fins all light brown, but soft dorsal and anal each with black pale edged ocellus little smaller than eye.

¹³ For the late Bradshaw Swales, in slight appreciation of his general interest in natural history.

Known only from the two examples described above.

Diagnosis.—It differs at once from the preceding species *Chorististium susumi* in the coloration.

22454. Togian Bay, Togian Island, Gulf of Tomini, Celebes, Dutch East Indies. November 19, 1909. Length 59 mm. (Type Cat. No. U.S.N.M. 89983.)

(2055). Togian Bay, Togian Island. November 19, 1909. Length 55 mm. (Paratype.)

Genus MALAKICHTHYS Steindachner and Döderlein

Malakichthys (DÖDERLEIN) STEINDACHNER and DÖDERLEIN, Denksehr. Akad. Wiss. Wien, vol. 47, pt. 1, 1883, p. 240. Type *Malakichthys griseus* (DÖDERLEIN) STEINDACHNER and DÖDERLEIN, monotypic.

Malacichthys BOULENGER and OGILVIE GRANT, Zool. Record, Pisces, 1883, p. 19. Type *Malakichthys griseus* (DÖDERLEIN) STEINDACHNER and DÖDERLEIN.

Satsuma SMITH and POPE, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 472. Type *Satsuma macrops* SMITH and POPE, orthotypic.

Body oblong, compressed. Head pointed. Eye large. Mouth large. Maxillary with supplemental bone. Villiform teeth in bands in jaws, on vomer and palatines, none on tongue; no canines. Double protruded bony point at symphysis of lower jaw. Preopercle thin towards edge, with rather weak serrae above and below angle. Opercle with 2 spines, thin, flat, short. Gill membranes free. Gill rakers long, slender. Branchiostegals 7. Scales moderate, finely ctenoid, thin, easily deciduous. Opercle, cheek and head above scaly, snout and jaws naked. Lateral line complete, high, about parallel with back and tubes occupy median third of each scale. Dorsal with 9 slender spines, in soft fin spine and 10 rays. Anal with 3 spines and 7 rays. Caudal emarginate. Pectoral long, pointed, upper rays longest. Ventral inserted slightly behind pectoral bases, spine long, fins close together.

An aberrant genus, suggestive of *Amia*, but the opercle armed as in the Serranidae.

MALAKICHTHYS GRISEUS Steindachner and Döderlein

Malakichthys griseus (DÖDERLEIN) STEINDACHNER and DÖDERLEIN, Denksehr. Akad. Wiss. Wien, vol. 47, pt. 1, 1883, p. 240. Tokyo; vol. 48, pt. 1, 1884, pl. 2, figs. 1-la.—ISHIKAWA and MATSUURA, Prelim. Cat. Fishes Tokyo Mus., 1897, p. 57.—JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901 p. 353 (Tokyo).—JORDAN and RICHARDSON, Proc. U. S. Nat. Mus., vol. 37, 1910, p. 425, fig. 1 (Yodani, Misaki, Odawara).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 413 (Kagoshima).—IZUKA and MATSUURA, Cat. Zool. Spec. Tokyo Mus., 1920, p. 154 (Kagoshima).—JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 233 (Kagoshima and Shizuoka).

Satsuma macrops SMITH and POPE, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 472, fig. 5. Kagoshima.

Malakichthys wakiyae JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 233, pl. 10, fig. 2. Kagoshima Bay.

Depth $2\frac{1}{4}$ to 3; head $2\frac{1}{5}$ to $2\frac{2}{3}$, width $2\frac{1}{2}$ to $2\frac{1}{3}$. Snout $3\frac{2}{3}$ to $3\frac{4}{5}$ in head from snout tip; eye $2\frac{1}{3}$ to 3, greater than snout or interorbital; maxillary reaches $\frac{1}{4}$ to $\frac{1}{3}$ in eye, expansion 2 to $2\frac{1}{8}$ in eye, length $2\frac{1}{5}$ to $2\frac{1}{4}$ in head from snout tip; teeth villiform, in broad bands in jaws, on vomer and palatines; mandible with 2 external broad conic denticles; interorbital $4\frac{3}{4}$ to $4\frac{4}{5}$, level; preopercle edge denticulate; median opercular spine nearer lower, which most advanced. Gill rakers 6+21, lanceolate, longer than gill filaments or $\frac{1}{2}$ of eye.

Scales 46 to 49 in lateral line to caudal base and 3 to 5 more on latter; 5 or 6 above, 12 or 13 below, 40 or 41 predorsal, 6 rows on cheek to preopercle ridge; fins with fine scales basally; maxillary scaled, 5 rows across expansion. Scales with 7 or 8 basal radiating striae; apical denticles 24 to 65 in single row; circuli fine.

D. VIII or IX-I, 10, 1, fourth spine $2\frac{1}{2}$ to $3\frac{1}{10}$ in total head length, first branched ray $2\frac{3}{5}$ to $2\frac{4}{5}$; A. III, 7, 1, third spine $2\frac{7}{8}$ to 3, first ray $2\frac{2}{3}$ to $2\frac{7}{8}$; caudal $1\frac{2}{3}$ to $1\frac{1}{2}$, deeply forked, slender lobes sharply pointed; least depth of caudal peduncle $3\frac{4}{5}$ to $4\frac{2}{5}$; pectoral $1\frac{1}{2}$; ventral 2 to $2\frac{1}{2}$.

Back brown, sides and below silvery white. Iris silvery white. Fins all pale, slightly dusky on spinous dorsal terminally.

Japan, Formosa, China, Philippines.

2785 (D. 5260). Balanja Point, N. 28° W., 7.20 miles (12° 25' 35" N., 121° 31' 35" E.), off southeastern Mindoro. In 234 fathoms. June 3, 1908. Length 174 mm.

Twenty-four examples (D. 5353). Cape Melville Light, S. 85° E., 16.8 miles (7° 50' 45" N., 116° 43' 15" E.), Balabac Strait. In 148 fathoms. January 1, 1909. Length 65 to 78 mm.

2858 to 2861 (D. 5403). Capitancillo Island Light, S. 46° W., 15.7 miles (11° 10' N., 124° 17' 15" E.), between Leyte and Cebu. In 182 fathoms. March 16, 1909. Length 137 to 161 mm.

2669 (D. 5272). Corregidor Light, N. 26° E., 25.50 miles (14° N., 120° 22' 30" E.), China Sea, vicinity southern Luzon. In 118 fathoms. July 14, 1908. Length 82 mm.

Sixteen examples (D. 5273). Corregidor Light, N. 27° E., 27.25 miles (13° 58' 45" N., 120° 21' 35" E.), China Sea, vicinity southern Luzon. In 114 fathoms. July 14, 1908. Length 37 to 78 mm.

10129, 10130, 10248 (D. 5501). Macabalan Point Light, S. 35° E., 8.2 miles (8° 37' 37" N., 124° 35' E.), northern Mindanao. In 214 fathoms. August 4, 1909. Length 164 to 238 mm. 10 examples.

10131, 10195 (D. 5502). Macabalan Point Light, S. 35° E., 8.2 miles (8° 37' 37" N., 124° 35' E.), northern Mindanao. In 214 fathoms. August 4, 1909. Length 178 to 210 mm. 8 examples.

4238, 4239 (D. 5503). Macabalan Point Light, S. 31° E., 6.6 miles (8° 36' 26" N., 124° 36' 08" E.), northern Mindanao. In 226 fathoms. August 4, 1909. Length 185 to 196 mm.

10132, 10194, 10196, 10279 (D. 5505). Macabalan Point Light, S. 31° E., 7.7 miles (8° 37' 15" N., 124° 36' E.), northern Mindanao. In 220 fathoms. August 5, 1909. Length 206 to 229 mm.

- 2862 (D. 5367). Malabrigo Light, N. 81° E., 8 miles ($13^{\circ} 34' 37''$ N., $121^{\circ} 07' 30''$ E.), Verde Island Passage. In 180 fathoms. February 22, 1909. Length 162 mm.
- 3243, 3244 (D. 5577). Mount Dromedario, S. 9° W., 10.9 miles ($5^{\circ} 20' 36''$ N., $119^{\circ} 58' 51''$ E.), north of Tawi Tawi. In 240 fathoms. September 23, 1909. Length 155 to 163 mm.
- Two examples (D. 5545). Noble Point, Tulayan Island, S. 19° W., 3 miles ($6^{\circ} 04' 45''$ N., $121^{\circ} 20' 20''$ E.), Jolo Island vicinity. In 114 fathoms. September 15, 1909. Length 46 to 50 mm.
- One example (D. 5393). Panganalán Point, Talajit Island, S. 59° E., 14.8 miles ($12^{\circ} 03' 30''$ N., $124^{\circ} 03' 36''$ E.), between Samar and Masbate. In 136 fathoms. March 13, 1909. Length 80 mm.
- 4561 to 4563 (D. 5394). Panalangan Point, Talajit Island, S. 68° E., 8.1 miles ($12^{\circ} 00' 30''$ N., $124^{\circ} 05' 36''$ E.), between Samar and Masbate. In 153 fathoms. March 13, 1909. Length 82 to 112 mm.
- 2325 to 2335, 2437, 2438 (D. 5396). Panalangan Point, Talajit Island, S. 78° E., 4.5 miles ($11^{\circ} 57' 27''$ N., $124^{\circ} 12' 24''$ E.), between Samar and Masbate. In 137 fathoms. March 15, 1909. Length 83 to 213 mm.
- Thirty-one examples (D. 5397). Panalangan Point, Talajit Island, S. 78° E., 6 miles ($11^{\circ} 57' 27''$ N., $124^{\circ} 10' 42''$ E.), between Samar and Masbate. In 134 fathoms. March 15, 1909. Length 80 to 125 mm.
- Five examples (D. 5516). Point Tagolo Light, S. 80° W., 9.7 miles ($8^{\circ} 46'$ N., $123^{\circ} 32' 30''$ E.), Mindanao. In 175 fathoms. August 9, 1909. Length 105 to 150 mm.
- 4262 to 4264 (D. 5517). Point Tagolo Light, S. 83° W., 10.5 miles ($8^{\circ} 45' 30''$ N., $123^{\circ} 33' 45''$ E.), Mindanao. In 169 fathoms. August 9, 1909. Length 134 to 180 mm.
- 2215 to 2218 (D. 5519). Point Tagolo Light, S. 71° W., 8.7 miles ($8^{\circ} 47'$ N., $123^{\circ} 31' 15''$ E.), Mindanao. In 182 fathoms. August 9, 1909. Length 142 to 160 mm.
- 3678 (D. 5441). San Fernando Point Light, S. 87° E., 18.7 miles ($16^{\circ} 38'$ N., $119^{\circ} 57' 18''$ E.), west coast Luzon. In 186 fathoms. May 10, 1909. Length 170 mm.
- 3440 (D. 5542). Tagolo Light, S. 70° W., 13.2 miles ($8^{\circ} 48' 30''$ N., $123^{\circ} 35' 30''$ E.), northern Mindanao. In 200 fathoms. August 20, 1909. Length 152 mm.
- 2130, 2131 (D. 5318). China Sea, vicinity Formosa ($21^{\circ} 32'$ N., $117^{\circ} 46'$ E.). In 340 fathoms. November 5, 1908. Length 172 to 175 mm.
- 4364 (D. 5312). China Sea, vicinity Hong Kong ($21^{\circ} 30'$ N., $116^{\circ} 32'$ E.). In 140 fathoms. November, 1908. Length 70 mm.

Genus LATEOLABRAX Bleeker

Lateolabrax BLEEKER, Verh. Batav. Genootsch. (Japan), vol. 26, 1857, pp. 4, 53. Type *Labrax japonicus* CUVIER, monotypic.

Body compressed. Mouth large, protractile. Maxillary exposed, with supplemental bone. Villiform teeth in jaws and on vomer and palatines; tongue smooth. Preopercle serrated, with few strong antrorse spines on lower edge. Opercle ends in spines. Gill membranes separate. Pseudobranchiae present. Gill rakers long and slender. Branchiostegals 7. Vertebrae 35, of which 18 caudal. Scales small, smooth or ciliated. Head scaly. Lateral line complete, tubes straight and each occupies nearly whole length of scale. Dorsal

with 11 or 12 spines, soft fin preceded by 1 or 2 spines and rays 12 to 14, spinous portion longer than soft portion. Anal spines 3, rays 8 or 9, fin short. Caudal emarginate. Pectoral rays 16 to 18, asymmetrical, obtusely pointed, upper rays longest. Ventral behind pectoral, with strong spine, fins close together.

China, Japan.

LATEOLABRAX JAPONICUS (Cuvier)

Labrax japonicus CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 85. Japan.—RICHARDSON, Ichth. China, Japan, 1846, p. 222 (Hong Kong, Canton, Peiho, Chusan, Japan).—BLEEKER, Verh. Batav. Genootsch., No. 7, vol. 26, 1857, p. 23 (Nagasaki).

Perca labrax japonicus SCHLEGEL, Fauna Japon., Poiss., pt. 1, 1842, p. 2, pl. 2, fig. 1 (Japan).

Percalabrax japonicus GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 71 (China, Japan).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 13 (Shanghai).—GÜNTHER, Ann. Mag. Nat. Hist. London, ser. 4, vol. 12, 1873, p. 240 (Shanghai).—MARTENS, Preuss. Exp. Ost-Asien, vol. 1, 1876, p. 385 (Yokohama, Nagasaki, Shanghai).—GÜNTHER, Rep. Voy. Challenger, vol. 1, 1880, p. 63 (Inosima; Inland Sea).—STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 47, pt. 1, 1883, p. 228, pl. 4, fig. 3 (Tokyo).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 458 (Luzon, Butaun, Orion).—ISHIKAWA and MATSUURA, Prelim. Cat. Fishes Mus. Tokyo, 1897, p. 57 (Hokkaido).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 249 (Tsuruga, Japan).

Lateolabrax japonicus BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 123 (Chefoo, Shanghai, Hae-yoe, China, Amoy, Chusan, Formosa).—JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 353 (Tokyo); Annot. Zool. Japon., vol. 3, 1901, p. 72 (Yokohama, Nagasaki, Shimoda).—JORDAN and SEALE, Proc. U. S. Nat. Mus., vol. 29, 1905, p. 521 (Shanghai).—JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 517 (Port Arthur, Manchuria).—JORDAN and RICHARDSON, Mem. Carnegie Mus., vol. 4, No. 4, 1909, p. 183 (Keerun); Proc. U. S. Nat. Mus., vol. 37, 1910, p. 429 (Yokohama, Tokyo, Wakanoura, Kurume, Chikugo River, Matsushima, Kagoshima, Nagasaki, Hiroshima, Onomichi, Tsuruga, Hakodate, Kobe).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 413 (Tokyo, Misaki, Kagoshima).—JORDAN and METZ, Mem. Carnegie Mus., vol. 6, No. 1, 1913, p. 30 (Fusan, Korea).—JORDAN and THOMPSON, Mem. Carnegie Mus., vol. 6, No. 4, 1914, p. 248 (Shimonoseki and Shinabara).—IZUKA and MATSUURA, Cat. Zool. Spec. Tokyo Mus., 1920, p. 154 (Hokkaido).—JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 234 (Sapporo, Tokyo, Kobe, Kagoshima Bay, Mikawa Bay, Miyazu, Kukuoka, Lake Kasumigaura).

Percalabrax poecilnotus GUICHENOT, Pisc. en Chine Dabry de Thiers, 1872, pl. 26, fig. 2. China.—SAUVAGE, Bull. Soc. Philom. Paris, ser. 7, vol. 5, 1881, p. 104 (Swatow, China).

Percalabrax spilonotus GUICHENOT, Pisc. en Chine Dabry de Thiers., 1872, pl. 26, fig. 3. China.

Percalabrax tokionensis (DÖDERLEIN) STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 47, pt. 1, 1883, p. 228. Tokyo. (Name in text.)

Depth $3\frac{1}{3}$ to $3\frac{3}{4}$; head 3 to $3\frac{1}{8}$, width $2\frac{2}{3}$ to $2\frac{1}{5}$. Snout $3\frac{7}{8}$ to $4\frac{1}{3}$ in head from snout tip; eye $3\frac{1}{4}$ to $6\frac{1}{8}$, greater than snout or

interorbital; maxillary reaches $\frac{3}{5}$ in eye to little beyond with age; expansion $1\frac{1}{6}$ to $2\frac{1}{2}$ in eye, length $2\frac{1}{6}$ to $2\frac{1}{3}$ in head from snout tip; teeth villiform, in bands in jaws, outer laterals scarcely enlarged; interorbital 5 to $5\frac{1}{3}$, flattened, frontal ridges conspicuous; hind preopercle edge minutely serrated and several serrae conspicuously enlarged; 3 spines along lower preopercle edge directed downward; lower opercular spine longest and most posterior. Gill rakers 7 to $9+15$ to 17, lanceolate, $\frac{3}{5}$ of eye; 3 upper sometimes rudimentary.

Scales 80 to 88 in lateral line to caudal base and 6 to 14 more on latter; 14 or 15 above, 17 or 18 below, 50 to 62 predorsal; 10 to 20 rows across cheek to preopercle ridge and 6 more on preopercle flange; scales largest on flanks and very small and crowded at bases of rayed vertical fins and on predorsal region; low scaly sheaths along spinous dorsal and anal bases; maxillary, end of snout and preorbital naked. Scales with 7 to 9 basal radiating striae; apical denticles 43 to 56; circuli fine.

D. XIII or XIV, 12, 1 or 13, 1, fourth spine 2 to $2\frac{1}{5}$ in total head length, sixth ray $2\frac{3}{5}$ to $2\frac{2}{3}$; A. III, 8, 1, second spine $2\frac{1}{3}$ to $2\frac{2}{5}$, first ray $2\frac{1}{10}$ to $2\frac{1}{8}$; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, emarginate; least depth of caudal peduncle 3 to $4\frac{1}{8}$; pectoral $1\frac{3}{5}$ to $2\frac{1}{5}$; ventral $1\frac{3}{5}$ to $1\frac{7}{8}$.

Silvery gray brown, lower sides and under surface silvery white. In large examples back, chiefly above lateral line, also spinous and soft dorsal marked with many irregular dark spots, not extending on head or predorsal region. Iris brown and silvery. Dorsals and caudal pale gray brown, other fins pale brownish.

China and Japan. Though listed from the Philippines by Elera no other notice of its occurrence has been given.

6834. Hong Kong market. October 18, 1909. Length 356 mm.

Genus NIPHON Cuvier

Nippon CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 131. Type *Nippon spinosus* CUVIER, monotypic.

Body compressed. Mouth large, protractile. Maxillary exposed, without supplementary bone. Villiform teeth in jaws, on vomer and palatines; tongue smooth. Preopercle serrate, with very strong spine at angle and few small antrorse spines on lower edge. Opercle with 3 strong spines. Gill membranes separate. Pseudobranchiae present. Gill rakers long and slender. Branchiostegals 7. Vertebrae 31, of which 17 caudal. Scales very small, ciliated. Head scaly. Lateral line complete, tubes straight and each occupies whole length of scale. Dorsal with 11 or 12 spines, soft fin with spine and 10 or 11 rays and shorter than spinous fin. Anal spines 3, rays 7, fin short. Caudal slightly emarginate. Pectoral rays 16 or 17, partly symmetrical, rounded, upper rays longest. Ventral with strong spine, below pectoral base, fins close together.

Japan, Philippines.

NIPHON SPINOSUS Cuvier

Nippon spinosus CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 131, pl. 19. Japan.—SCHLEGEL, Fauna Japon. Poiss., pt. 1, 1842, p. 1, pl. 1, figs. 1-2 (coasts of southern provinces, Jeso).—RICHARDSON, Ichth. China, Japan, 1846, p. 222 (Japan).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 80 (Japan); Rep. Voy. Challenger, Zool., vol. 1, 1880, p. 63 (Yokohama).—STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 47, pt. 1, 1883, p. 228 (Tokyo).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 124 (Yokohama).—ISHIKAWA and MATSUURA, Prelim. Cat. Fishes Mus. Tokyo, 1897, p. 57 (Tokyo, Hizen, Boshu).—JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 353 (Tokyo), p. 750 (Yokohama); Annot. Zool. Japon., vol. 3, 1901, p. 72 (Yokohama and Nagasaki).—SMITH and POPE, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 468 (Kochi).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 255 (Cuyo); Proc. U. S. Nat. Mus., vol. 37, 1910, p. 431 (Misaki and Philippines).—JORDAN and THOMPSON, Mem. Carnegie Mus., vol. 6, No. 6, 1914, p. 248 (Osaka and Misaki).—IZUKA and MATSUURA, Cat. Zool. Spec. Tokyo Mus., 1920, p. 154 (Boshu).—JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 234 (Tokyo, Toyana, Misaki, Miyazu, Fuku).

Depth $3\frac{2}{5}$ to $3\frac{3}{5}$; head $2\frac{1}{3}$ to $2\frac{2}{5}$, width $2\frac{1}{5}$. Snout $2\frac{7}{8}$ to $3\frac{1}{8}$ in head from snout tip; eye 4 to $5\frac{3}{4}$, $1\frac{1}{4}$ to $2\frac{1}{8}$ in snout, much greater than interorbital in young to $1\frac{1}{5}$ with age; maxillary reaches slightly beyond front eye edge or opposite front pupil edge, expansion $1\frac{2}{3}$ to 2 in eye, length $2\frac{1}{2}$ to $2\frac{3}{5}$ in head from snout tip; teeth villiform, in bands in jaws, on vomer and palatines, none on tongue; interorbital 5 to $5\frac{1}{3}$, nearly level; strong spine at angle of preopercle nearly long as eye with age and edge above serrate, also several large denticles on lower edge; lower preorbital edge finely serrate; opercular spines equidistant, lower most advanced. Gill rakers 7+17, lanceolate, longer than gill filaments or $1\frac{1}{3}$ in eye; 4 or 5 above and below rudimentary.

Scales 130 in lateral line to caudal base and 10 more on latter; pores 85 in lateral line to caudal base and 6 more on latter; 25 scales above lateral line, 46 to 48 below, 33 predorsal to occiput, 15 across cheek to preopercle ridge; muzzle and maxillary naked. Small scales over soft dorsal and caudal basally. Tubes in lateral line moderately small, well exposed. Scales with 4 or 5 basal radiating striae; apical denticles 18 to 20, with 4 or 5 transverse series of basal elements; circuli fine.

D. XII, I, 10, 1, membranes of spinous fin deeply notched, fourth spine $2\frac{1}{3}$ to $2\frac{1}{2}$ in total head length, second ray $2\frac{1}{5}$ to $2\frac{3}{4}$; A. III, 7, 1, second spine 4 to $4\frac{1}{5}$, second ray $2\frac{1}{2}$ to $2\frac{4}{5}$; caudal $1\frac{4}{5}$ to 2, hind edge emarginate; least depth of caudal peduncle 4 to $4\frac{1}{5}$; pectoral 2 to $2\frac{1}{4}$; ventral 2 to $2\frac{1}{8}$.

Brown above, whitish below, color of back and lower surface contrasted by pronounced line of demarcation. In young distinct light longitudinal band extends from upper hind eye edge to below soft dorsal, obsolete with age. Fins all brown in adult. In young

spinous dorsal dusky and soft dorsal with broad dusky black anterior area, apex white and rest of fin pale. Caudal in young with blackish blotch on each lobe terminally and each blotch well separated with distinct whitish edges.

Japan and Philippines, from which latter locality we have no examples. The above description from Japanese examples in the U. S. National Museum received from Dr. H. M. Smith and the Japanese Government, 153 to 392 mm.

Genus **CENTROGENYS** Richardson

Centrogenys RICHARDSON, Ann. Mag. Nat. Hist., vol. 9, 1842, p. 120. Type

Centropristis scorpenoides CUVIER, monotypic.

Myriodon BARNEVILLE, Rev. Zool. (Soc. Cuvier.), 1847, p. 133. Type *Scorpaena vaigiensis* QUOY and GAIMARD, monotypic.

Gennadius JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 37. Type *Sebastes stoliczkae* DAY, monotypic.

Rhabdosebastes FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 60. Type *Sebastes stoliczkae* DAY, orthotypic.

Body compressed. Mouth large and protractile. Maxillary exposed with supplemental bone. Jaws with bands of villiform teeth; vomer and palatines with teeth; tongue smooth. Front nostril with fringed tentacle. Preopercle serrated, with strong antrorse spines on lower edge. Opercle with strong spine. Gill membranes separate. Pseudobranchiae present. Gill rakers very short. Branchiostegals 7. Lower pharyngeals united. Vertebrae 25, of which 14 caudal. Scales rather large, strongly ciliated. Head scaly, maxillary and mandible naked. Lateral line complete, tubes with ascending tubule extending to end of scale. Dorsal with 13 or 14 spines, rays 9 to 11, spinous part much longer than soft, which scaly basally. Anal with 3 spines and 5 rays, scaly basally. Caudal rounded. Pectoral with 13 or 14 rays, rounded, subsymmetrical. Ventral with strong spine, placed behind pectoral base.

Eastern Indian and Western Pacific Oceans. This genus and its genotype have so great a superficial resemblance to certain small scorpaenoids that they have repeatedly been referred to them.

CENTROGENYS VAIGIENSIS (Quoy and Gaimard)

Scorpaena vaigiensis QUOY and GAIMARD, Voy. Uranie, Zool., 1824, p. 324, pl. 58, fig. 1. Waigiu.

Myriodon vaigiensis GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 175 (Port Essington, Freycinet's Harbour, Australia).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 38 (Singapore).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (19) 297, fig. 1.—GÜNTHER, Rep. Voy. Challenger, vol. 1, 1880, p. 38 (between New Guinea and Australia).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 150 (Singapore).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 10 (Cebu).—DAY, Fishes of India, Suppl., 1888, p. 747 (correction); Fauna Brit. India, vol. 1, 1889, p. 461, fig. 145.—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 464 (Cebu).

Centrogenys waigiensis BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 68 (Java, Singapore, Bintang, Banka, Bawean, Celebes, Amboina, Timor, Waigiu).—O'SHAUGHNESSY, Zool. Rec., 1876, pisces, p. 10.—SNYDER, Proc. U.S. Nat. Mus., vol. 42, 1912, p. 497 (Riu Kiu).—BEAUFORT, Bijdr. Dierk., Amsterdam, 1913, p. 111 (Macassar).

Centrogenys waigiensis BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 147 (Singapore, Cebu, Torres Straits, Mabuiag Island, Port Essington, Freycinet's Harbour, Port Male, Australia).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 250 (Singapore).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 256 (Cuyo).—WEBER, Siboga Exp. vol. 57, Fische, 1913, p. 198 (Macassar; Saleyer; Dobo, Aru Islands).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 172 (compiled).

Centropristes scorpaenoides CUVIER, Hist. Nat. Poiss., vol. 3, 1829, p. 48. Waigiu; New Guinea.—RICHARDSON, Ann. Mag. Nat. Hist., vol. 9, 1842, p. 120.

Myriodon scorpaenoides BARNEVILLE, Rev. Zool. (Soc. Cuvier.), 1847, p. 130.

Sebastes stoliczkae DAY, Fishes of India, pt. 1, 1875, p. 148, pl. 36, fig. 1. Nicobars.

Gennadius stoliczkae JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 37 (Panay).

Rhabdosebastes stoliczkae FOWLER and BEAN, Proc. U.S. Nat. Mus., vol. 62, 1922, p. 60 (Cebu).

Depth $2\frac{2}{5}$ to $2\frac{7}{8}$; head $2\frac{1}{4}$ to $2\frac{1}{3}$, width 2 to $2\frac{1}{8}$. Snout $5\frac{1}{8}$ to $5\frac{1}{2}$ in head; eye $3\frac{1}{3}$ to $3\frac{1}{2}$, greater than snout or interorbital; maxillary reaches opposite eye center, expansion $\frac{2}{5}$ to $\frac{1}{2}$ in eye, length $2\frac{3}{4}$ to $2\frac{4}{5}$ in head; teeth finely villiform, in bands in jaws, on vomer and palatines; interorbital $5\frac{1}{2}$ to $5\frac{2}{3}$, convex; hind preopercle edge finely serrated and 3 large antrorse spines on lower edge graduated down from first or anterior which largest; opercle ends in single sharp spine. Gill rakers 5+11, asperous stumps.

Scales 40 or 41 in lateral line to caudal base and 3 or 4 more on latter; 6 above, 11 below, 23 predorsal, 6 rows across cheek; above lateral line scales in oblique rows; small scales on bases of most fins. Scales with 7 basal radiating striae; 66 to 68 apical denticles, with 3 to 5 transverse series of basal elements; circuli fine.

D. XIV, 10, 1, or 11, 1, third spine $2\frac{1}{5}$ to $2\frac{1}{4}$ in total head length, fourth ray $2\frac{2}{3}$ to $2\frac{3}{4}$; A. III, 5, 1, second spine $1\frac{1}{3}$ to $1\frac{2}{5}$, first ray 2 to $2\frac{1}{5}$; caudal $1\frac{2}{3}$ to $1\frac{4}{5}$, rounded; least depth of caudal peduncle 4 to $4\frac{1}{3}$; pectoral $1\frac{1}{3}$ to $1\frac{2}{5}$; ventral $1\frac{1}{2}$ to $1\frac{3}{5}$.

Pale brown, dark streaks extending along each scale series in old alcoholic specimens. Body with 3 oblique dark bands, ill defined and very variable. Dark or deep brown blotches and cross bars on fins, 4 on pectoral and ventral and 3 or 4 across anal and caudal. Belly and under surface of abdomen uniform pale to whitish.

India, East Indies, Philippines, Riu Kiu, Australia. The original figure by Quoy and Gaimard is poor. It shows but three dark bars

on the pectoral and two on the ventral, though they say "les taches des pectorales et des ventrales tendent à former trois lignes régulières."

21764, 21765. Cebu market. March 20, 1909. Length 102 to 112 mm.

13983, 13984. Iloilo market. May 31, 1908. Length 110 to 114 mm.

One example. Ligpo point, Balayan Bay. January 18, 1908. Length 70 mm.

19814. Point San Vincente, northern Luzon. November 18, 1908. Length 100 mm.

Genus PLECTROPOMUS Oken

Plectropomus OKEN, Isis, 1817, p. [1182] 1782 (on *Les Plectropomes* CUVIER, Règne Animal, vol. 2, 1817, p. 277). Type *Bodianus maculatus* BLOCH, designated by JORDAN, TANAKA, SNYDER, Journ. College Sci. Tokyo, vol. 33, 1913, p. 152.

Plectropoma (CUVIER) QUOY and GAIMARD, Voy. Uranie, Zool., pt. 7, 1824, p. 318. Type *Plectropoma punctatum* QUOY and GAIMARD=*Bodianus maculatus* BLOCH, monotypic.

Paracanthistius BLEEKER, Verh. Akad. Wet. Amsterdam, vol. 14, 1874, p. 13. Type *Holocentrus leopardus* LACÉPÈDE, orthotypic.

Body elongated, compressed. Mouth large, protractile. Maxillary exposed, with supplemental bone. Teeth in jaws in several series, inner movable, depressible, hinged at bases; very strong front canines in jaws and on side of mandible; teeth on vomer and palatines; tongue smooth. Preopercle entire or finely serrate behind, with antrorse spines on lower edge. Opercle with 3 spines. Gill membranes separate. Pseudobranchiae present. Gill rakers moderate. Vertebrae 24, of which 14 caudal. Scales very small, roughish but not ciliated. Head partly scaled, snout naked. Lateral line feebly marked, tubes very short and straight, scales ciliated. Dorsal with 6 to 8 spines, rays 11 to 12, spinous fin nearly long as soft fin. Anal with 3 spines very feeble and flexible, rays 8. Caudal truncate or emarginate. Pectoral rays 16 to 18, symmetrical, rounded. Ventral with feeble, flexible spine, below pectoral, fins close together.

Indian and western Pacific Oceans. Although Boulenger admits but two species our materials seem to vindicate the three of Bleeker, besides showing another which we describe as new.

ANALYSIS OF THE SPECIES

- a¹. PLECTROPOMUS. Soft dorsal and anal without front lobes distinctly marked and though front rays highest edges of fin slope obliquely back; body without dark vertical blue lines on flanks.
 - b¹. Caudal truncate; body with blue dark edged spots, moderate in size. truncatus
 - b². Caudal emarginate or lunate; body spotted or dotted with blue.
 - c¹. Body with pale blue dark edged spots of moderate size and sometimes with 5 dark brown cross bands.-----maculatus
 - c². Body with very numerous, small, dark edged dots.-----leopardus
- a². PLEUROPERCA, new subgenus. Soft dorsal and anal with distinct front lobes, edges of fins emarginate; body with variable vertical blue lines on flanks.-----oligacanthus

Subgenus PLECTROPOMUS Oken

Soft dorsal and anal without front lobes distinctly marked and though front rays highest edges of fin slope obliquely back. Body without dark vertical lines on flanks.

PLECTROPOMUS TRUNCATUS, new species

Depth $3\frac{1}{8}$ to $3\frac{2}{5}$; head $2\frac{3}{5}$ to $2\frac{1}{5}$, width $2\frac{1}{4}$ to $2\frac{2}{3}$. Snout $3\frac{3}{4}$ to $4\frac{3}{5}$ in head from snout tip; eye 4 to $7\frac{1}{2}$, 1 to $2\frac{1}{3}$ in snout, $1\frac{2}{5}$ to $1\frac{1}{3}$ in interorbital, greater than interorbital in young; maxillary reaches $\frac{3}{5}$ in eye to little beyond, expansion 1 to $1\frac{3}{4}$ in eye, length 2 to $2\frac{1}{8}$ in head from snout tip; teeth in narrow bands in jaws, pair of canines in front of each, also 2 or 3 on each mandibular ramus; narrow band of fine teeth on vomer and each palatine; interorbital

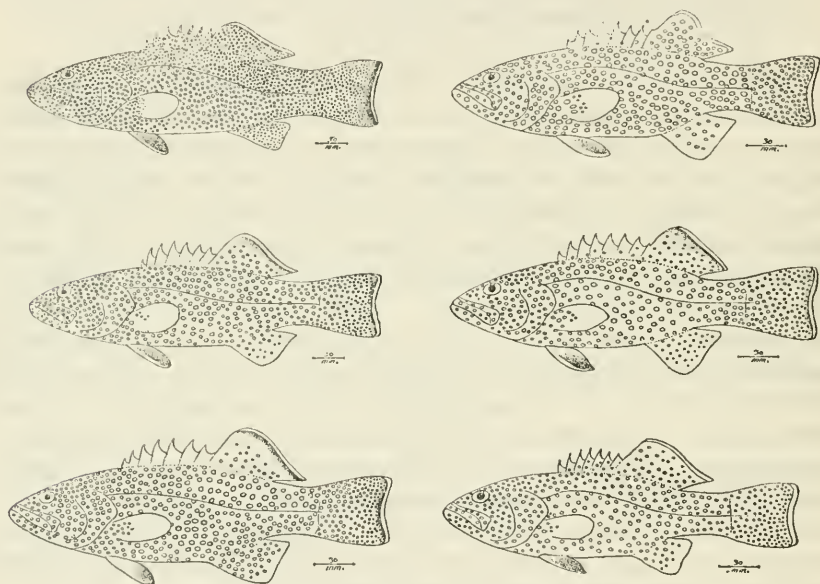


FIGURE 5.—PLECTROPOMUS TRUNCATUS, NEW SPECIES, VARIATION

$4\frac{1}{2}$ to 5 in head from snout tip, level; hind preopercle edge entire, lower edge with 3 or 4 antrorse spines; opercular spines 3, median nearer lower and upper most advanced. Gill rakers 6+9 to 12, short, $2\frac{1}{3}$ in gill filaments which $1\frac{1}{4}$ in eye; 5 upper and 7 to 10 lower rudimentary.

Scales 94 to 100 in lateral line to caudal base and 12 to 15? more on latter; tubes 81 to 84 in lateral line to caudal base and 8 to 10 more on latter; 13 to 16 scales above, 38 to 40 below, 36 to 40 predorsal to occiput, 23 to 25 rows across cheek to preopercle angle; maxillary covered with fine scales. Scales with 6 or 7 basal radiating striae; circuli fine.

D. VII, 1, 10, 1, or 1, 11, 1, third spine $3\frac{1}{2}$ to $3\frac{3}{4}$ in total head length, first branched ray $2\frac{1}{3}$ to $2\frac{3}{5}$; A. III, 1, 7, 1, third spine $4\frac{2}{5}$ to $5\frac{1}{4}$, first branched ray $2\frac{2}{5}$ to $3\frac{1}{8}$; caudal $1\frac{2}{3}$ to $1\frac{4}{5}$, truncate; least depth of caudal peduncle $2\frac{2}{5}$ to $2\frac{3}{5}$; pectoral $1\frac{4}{5}$ to $2\frac{1}{8}$; ventral $2\frac{1}{10}$ to $2\frac{1}{4}$.

Terra-cotta color or brown, slightly paler below. Head, body, and fins marked with small blue spots, less than pupil and all ocellated with deeper brown rings; spots much more numerous with age. Iris brown. Fins brown like body, only spots much smaller. Hind caudal edge narrowly whitish. Pectoral pale brownish and only few small spots basally. Ventral darker than pectoral.

East Indies and Philippines.

Diagnosis.—Apparently a valid species which we distinguish chiefly by its truncate caudal fin. The lower preopercular spines are relatively weak and the opercular spines more or less imbedded, often inconspicuous. The head, body, and fins are ornamented with large blue, black-edged spots. Readily known by its truncate caudal fin.

Type.—Cat. No. 89984, U.S.N.M.

16004. Alimango Bay, Burias Island. March 5, 1909. Length 85 mm.
 8918. Atulayan Island, Lagonoy Gulf, east coast Luzon. June 17, 1909. Length 350 mm. (Type No. 89984, U.S.N.M.)
 12706. Atulayan Bay, Luzon. June 18, 1909. Length 137 mm.
 7532, 7539. Endeavor Strait, Malampaya Sound, Palawan Island. December 23, 1908. Length 287–314 mm.
 9107. Gigoso Point, Samar Island. July 28, 1909. Length 323 mm.
 7254. Port Matalvi, Luzon. November 23, 1908. Length 518 mm.
 A549. Sulade Island, vicinity Jolo. September 17, 1909. Length 425 mm.
 A511. Tapiantana Island, south of Zamboanga. September 13, 1909. Length 370 mm.
 A681. Bumbum Island, vicinity of Darvel Bay, Borneo. September 25, 1909. Length 520 mm.
 A696. Si Amil Island, vicinity of Darvel Bay, Borneo. September 26, 1909. Length 288 mm.
 A830, A844. Talisse Island, north of Celebes. November 9, 1909. Length 262 to 365 mm.
 A1130. Kayoa Island. November 29, 1909. Length 475 mm.

PLECTROPOMUS MACULATUS (Bloch)

Bodianus maculatus BLOCH, Naturg. Ausländ. Fische, vol. 4, 1790, p. 48, pl. 228. Japan (likely Mauritius?).—WALBAUM, Artedi Pisc., vol. 3, 1792, p. 671 (on BLOCH).—FORSTER, Fauna Indica, 1795, p. 16.—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 331 (Japan).—LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 280, 293 (Japan).

Plectropoma maculatum CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 393 (Mauritius).—RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 110 (Mohila).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 156 (Red Sea).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 12 (Zanzibar and Seychelles).—GÜNTHER, Ann. Mag. Nat. Hist., ser. 3, vol. 20, 1867, p. 57 (Cape York, Queensland).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 689 (Koscir, Red Sea).—GÜNTHER, Journ. Mus. Godeffroy,

- vol. 1, pt. 1, 1873, p. 10, pl. 10 (East Africa, Japan, Australia, Polynesia).—ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 265 (Fair Cape, Queensland).—KLUNZINGER, Sitz. Ber. Akad. Wiss. Wien, vol. 80, pt. 1, 1879, p. 335 (Port Denison, Queensland).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 150 (Singapore).—KLUNZINGER, Fische Roth. Meer., 1884, p. 8.—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 9 (Kordo, Mysore).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 160 (Zanzibar, Singapore, Cape York, Samoa, Red Sea, Mauritius, Louisiades, Levuka, Pelew Islands, Ceylon, Seychelles).—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 414 (Ternate).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 206 (Saleyer).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 469 (Mozambique coast).
- Plectropomus maculatus* JORDAN and RICHARDSON, Proc. U. S. Nat. Mus., vol. 37, 1910, p. 442 (compiled).
- Paracanthistius maculatus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 26 (Singapore, Java, Celebes, Halmahera, Ternate).—BEAUFORT, Bijd. Dierk., Amsterdam, 1913, p. 111 (Macassar).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 172 (Faté, Funafuti, Apiang).
- Acanthistius maculatus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (13) 291, fig. 3.
- Plectropoma punctatum* QUOY and GAIMARD, Voy. Uranie, Zool., pt. 7, 1824, p. 318, pl. 45, fig. 1. Mauritius.
- Plectropoma pessuliferum* FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 520, pl. 17, upper fig. Padang, Sumatra.

Depth $3\frac{1}{6}$ to $3\frac{2}{3}$; head $2\frac{7}{8}$ to 3, width $1\frac{3}{5}$ to $2\frac{1}{2}$. Snout $2\frac{4}{5}$ to $3\frac{1}{3}$ in head from snout tip; eye $5\frac{7}{8}$ to 6, $1\frac{3}{4}$ to 2 in snout, $1\frac{1}{8}$ to $1\frac{1}{4}$ in interorbital; maxillary reaches half way in eye or to hind eye edge, expansion $1\frac{1}{4}$ to $1\frac{1}{2}$ in eye, length $2\frac{1}{8}$ to $2\frac{1}{6}$ in head from snout tip; teeth in narrow bands in jaws, with upper outer series little larger; pair of canines in front of each jaw and 2 lateral canines on each mandibular ramus; narrow band of fine teeth on vomer and on each palatine; interorbital 5 to $5\frac{1}{5}$, level; hind preopercle edge entire, with 3 to 4 antrorse spines on lower edge; opercular spines 3, median little lower. Gill rakers 7+13, lanceolate, $1\frac{1}{2}$ in eye; 5 above and 8 below rudimentary.

Scales 103 to 105 in lateral line to caudal base and 18 to 20 more on latter; tubes 83 to 86 in lateral line to caudal base and 6 to 8 more on latter; 17 or 18 scales above, 40 to 43 below, 42 to 44 predorsal forward to occiput; 26 to 28 rows across cheek to preopercle angle; body scales without small basal accessory scales; maxillary expansion with patch of small scales in 2 to 6 transverse series; snout, preorbital, and interorbital naked; fins basally with fine scales. Scales with 2 to 5 basal radiating striae (small examples with 7 to 12 apical denticles with 4 to 7 transverse series) and circuli fine.

D. VII, 1, 10, 1 or 1, 11, 1, third spine $3\frac{1}{4}$ to 4 in total head length, third ray $2\frac{1}{5}$ to $2\frac{3}{5}$; A. III, 1, 7, 1, third spine $4\frac{2}{3}$ to 5, first ray 2 to $2\frac{1}{5}$; caudal $1\frac{1}{5}$ to $1\frac{1}{2}$, concave behind; least depth of caudal peduncle $2\frac{2}{5}$ to $2\frac{3}{4}$; pectoral $1\frac{7}{8}$ to 2; ventral $1\frac{3}{4}$ to $1\frac{7}{8}$.

Light brown, usually little paler below. Back and sides above with pale-blue dark-edged spots, some on head and flanks elongated and bar like. Iris brown, some small blue spots on bases of soft dorsal, anal, and caudal. Paired fins pale brown, unspotted.

Red Sea, East Africa, Zanzibar, Mozambique, Mauritius, Seychelles, India, Ceylon, East Indies, Philippines, Japan, Queensland, Melanesia, Micronesia, Polynesia. Our series of specimens all show rather large spots variably present on the fins and sometimes as short vertical bars as those on the flanks in the nominal *Plectropoma pessuliferum*.

5522. Catbalogan, western Samar. April 16, 1908. Length 390 mm.

5521. Catbalogan. April 15, 1908. Length 218 mm.

7608. Endeavor Strait, Palawan. December 24, 1908. Length 385 mm.

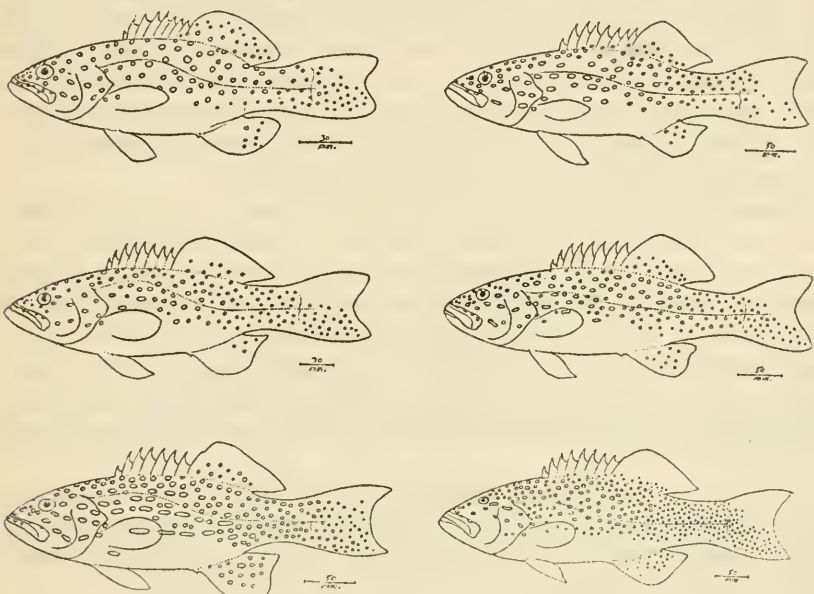


FIGURE 6.—PLECTROPOMUS MACULATUS (BLOCH), VARIATION

6289. Manila market. January 12, 1908. Length 580 mm.

9036. Natabas Point, Samar. July 24, 1909.

A. 1352. Great Tobea Island. December 15, 1909. Length 363 mm.

PLECTROPOMUS LEOPARDUS (Lacépède)

Holocentrus leopardus LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 332, 367.
No locality.

Plectropoma leopardinum CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 392, pl. 36 (Indian Ocean).—SCHLEGEL, Fauna Japon., Poiss., pt. 1, 1842, p. 12 (Nagasaki).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 157 (Louisianes).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 150 (Ceylon).

Plectropoma leopardus RICHARDSON, Ichth. China, Japan, 1846, p. 230 (compiled).

Paracanthistius leopardinus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 25 (Java).

Acanthistius leopardinus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (18) 296, fig. 3.

Plectropoma (maculatum) areolatum RÜPPELL, Atlas Reise nördl. Afrika, Fische (Alph. Verz. beschrieb. Fische), 1828, p. (143). Red Sea.

Plectropoma cyanostigma BLEEKER, Natuur. Genesk. Arch. Nederland. Indië, vol. 2, 1845, p. 525. Batavia, Java.

Depth $3\frac{1}{8}$ to $3\frac{1}{3}$; head $2\frac{4}{5}$ to 3, width $2\frac{1}{10}$ to $2\frac{2}{5}$. Snout 3 to $3\frac{1}{3}$ in head from snout tip; eye $5\frac{1}{3}$ to $7\frac{3}{5}$, $1\frac{1}{2}$ to $2\frac{2}{5}$ in snout, $1\frac{1}{8}$ to $1\frac{2}{3}$ in interorbital; maxillary reaches $\frac{2}{5}$ in eye to hind eye edge with age, expansion 1 to $1\frac{1}{3}$, length 2 to $2\frac{1}{5}$ in head from snout tip; teeth in narrow bands in jaws, pair of canines in front of each and 2 or 3 in each mandibular ramus; narrow band of small teeth on vomer and narrower one on each palatine; hind nostril twice size of front nostril; interorbital $4\frac{1}{2}$ to $5\frac{1}{2}$, level; hind preopercle edge with few minute serrae below and 3 or 4 strong antrorse spines along lower edge; opercular spines 3, median closer to lower which most forward. Gill rakers 6 + 10 or 11, lanceolate, little less than gill filaments or half of eye; 4 above and 1 or 2 below rudimentary.

Scales 108 to 115 in lateral line to caudal base with 13 to 15 more on latter; tubes 73 to 81 in lateral line to caudal base and 7 to 14 more on latter; 20 or 21 scales above, 34 to 44 below, 40 to 52 predorsal to occiput; 23 to 25 rows across cheek to preopercle angle; upper half of opercle scaly, with 10 transverse rows of scales; snout and interorbital naked; fins with fine scales basally; body scales without fine auxiliary basal scales. Scales with 5 to 17 basal radiating striae (12 to 16 apical denticles in small examples) and circuli moderate.

D. VIII, 1, 9, 1, or 1, 10, 1, third spine $3\frac{1}{3}$ to $3\frac{2}{3}$ in total head length, first branched ray $2\frac{1}{6}$ to $2\frac{7}{8}$; A. III, 1, 7, 1, third spine $3\frac{4}{5}$ to $5\frac{1}{3}$, first branched ray $2\frac{1}{4}$ to $2\frac{2}{3}$; caudal $1\frac{1}{4}$ to $1\frac{3}{5}$, emarginate behind; least depth of caudal peduncle $2\frac{1}{2}$ to $3\frac{1}{8}$; pectoral $1\frac{4}{5}$ to $2\frac{1}{4}$; ventral $1\frac{7}{8}$ to $2\frac{1}{3}$.

Brown, nearly uniform and variously light or dark. Body and fins everywhere with numerous fine, slightly darker spots, often fading in preservation. Though pectoral usually unspotted sometimes with small blue spots. Ventral usually darker brown.

Red Sea, Ceylon, East Indies, Philippines, Japan, Melanesia. Several of our specimens (7362, 8688, and 8900) are varietal. They have the pectorals with a distinct light colored margin and the broader interorbital more flattened.

18659. Alimango Bay, Burias Island. March 5, 1909. Length 237 mm.

8062. Anabayas Islands. March 2, 1909. Length 402 mm.

8919. Atulayan Island. June 18, 1909. Length 410 mm.

7786. Balabac. January 4, 1909. Length 351 mm.

8688. Batag Island, east coast Luzon. June 3, 1909. Length 600 mm.
 17067. Bisucay Island. April 9, 1909. Length 250 mm.
 7475. Bolalo Bay, Palawan Island. December 21, 1908. Length 250 mm.
 8081. Burias Island. March 5, 1909. Length 360 mm.
 8318. Destacado Island. March 13, 1909. Length 295 mm.
 7515, 7553, 7598. Endeavor Strait, Palawan Island. December 22-24, 1908.
 Length 385 to 433 mm.
 17300. Gigoso Point, Quinapundan Bay, Samar. July 28, 1909. Length 218 mm.
 8765, 8766. Lahuy Island, Pocket Bay, east coast Luzon. June 11, 1909.
 Length 250 to 268 mm.
 18550. Langao Point, southern Luzon. June 24, 1909. Length 235 mm.
 7896. Luzon Point, Manila Bay. January 21, 1909. Length 535 mm.
 8900. Near Palag Bay, Luzon. June 16, 1909. Length 625 mm.
 8180. Port Busin, Burias Island. March 8, 1909. Length 270 mm.
 6389, 9020. Port Jamelo, Luzon. July 13, 1908. Length 205 to 290 mm.
 8535. Port Langean, Dumarán Island, vicinity eastern Palawan. April 8, 1909.
 Length 441 mm.
 8777. Quinalasag Island, Masamat Bay, east coast Luzon. June 12, 1909.
 Length 343 mm.
 5717. Surigao, east coast Mindanao. May 8, 1908. Length 285 mm.
 7852. Taganak Island, Jolo Sea. January 7, 1909. Length 385 mm.
 7342, 12494 (773). Tara Island, Mindoro Strait. December 14, 1908. Length 211 to 277 mm.
 7362. Tara Island. December 15, 1908. Length 470 mm.
 A569. Tutu Bay, Jolo Island. September 19, 1909. Length 415 mm.
 5999. Zamboanga market. May 26, 1908. Length 43 mm.

PLEUROPERCA,¹⁴ new subgenus

Type.—*Plectropoma oligacanthus* BLEEKER.

Diagnosis.—Soft dorsal and anal with distinct front lobes, edges of fins emarginate. Body with variable vertical blue lines on flanks.

PLECTROPOMUS OLIGACANTHUS Bleeker

Plectropoma oligacanthus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 7, 1854, p. 422. Batavia, Java.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 157 (copied).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 162 (Malay Archipelago and Carolines).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 463 (Santa Cruz, Luzon, Cavite).

Paracanthistius oligacanthus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 27 (Java, Celebes, Amboina).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 173 (compiled).

Acanthistius oligacanthus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (1) 279, fig. 2.

Depth $3\frac{1}{5}$ to $3\frac{2}{5}$; head $2\frac{7}{8}$ to $3\frac{1}{8}$, width $2\frac{1}{3}$ to $2\frac{2}{5}$. Snout 3 to $3\frac{2}{5}$ in head from snout tip; eye $5\frac{1}{5}$ to $8\frac{2}{5}$, $1\frac{3}{4}$ to 3 in snout, 1 to $1\frac{1}{2}$ in interorbital; maxillary reaches $\frac{1}{5}$ to $\frac{3}{4}$ in eye, expansion 1 to $1\frac{2}{5}$, length $2\frac{1}{10}$ to $2\frac{1}{8}$ in head from snout tip; teeth above in narrow band, pair of canines in front of each jaw and 3 canines in each mandibular ramus; narrow band of fine teeth on vomer and one on each palatine; hind nostril greatly larger than front one,

¹⁴ Πλευρά rib, with reference to the blue parallel lines on the flanks; Περκη perch.

half size of pupil; interorbital $4\frac{3}{4}$ to $5\frac{1}{4}$ in head from snout tip; preopercle edge entire; median opercular spine closer to lower which opposite upper. Gill rakers $5+12$, lanceolate, little longer than gill filaments or $1\frac{3}{5}$ in eye; 3 upper and 3 lower rudimentary.

Scales 93 to 133 in lateral line to caudal base and 12 to 15 more on latter; tubes 83 to 90 in lateral line to caudal base and 11 to 20 more on latter; 17 to 20 scales above, 34 to 40 below, 37 to 40 predorsal forward to occiput only; 23 to 25 rows across cheek to preopercle edge; body scales without small basal auxiliary scales; fine scales over most all fins; maxillary with upper half of expansion finely scaled in 7 or 8 transverse rows. Scales with 4 or 5 basal radiating striae, with 1 to 5 more incomplete auxiliaries; circuli fine.

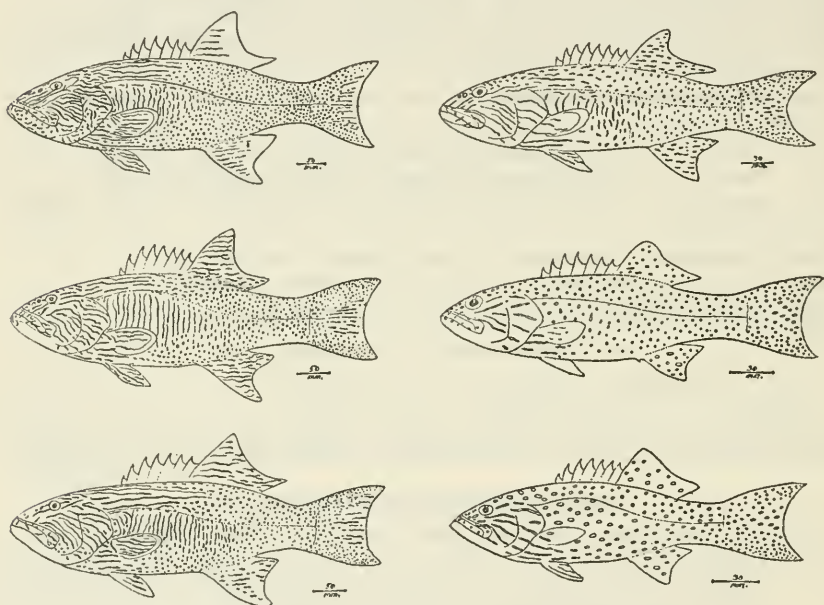


FIGURE 7.—*PLECTROPOMUS OLIGACANTHUS* BLEEKER, VARIATION

D. VII or VIII, II, 9, I, or II, 10, I, third spine $3\frac{3}{5}$ to $3\frac{7}{8}$ in total head length, first branched ray $1\frac{2}{3}$ to $2\frac{1}{3}$; A. III, I, 7, I, third spine $3\frac{1}{2}$ to $4\frac{3}{5}$, second branched ray $1\frac{7}{8}$ to $2\frac{2}{5}$; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, emarginate behind; least depth of caudal peduncle $2\frac{2}{3}$ to $2\frac{4}{5}$; pectoral 2 to $2\frac{1}{3}$; ventral $2\frac{1}{5}$ to $2\frac{1}{4}$.

Brown above, paler below. Head, back anteriorly, also soft dorsal and anal fins, with dark brown longitudinal lines. Dark brown vertical parallel lines all along flanks and rest of body and caudal spotted finely with dark brown. Pectoral dark brown with blue lines, hind border yellowish. Ventral brown, paler basally.

East Indies, Philippines, Micronesia. A well-marked species allied with *Plectropomus maculatus* but with an entirely different color pattern. Also with age the soft dorsal and anal have an elevated front lobe.

8961. Albay Gulf, Luzon. June 21, 1909. Length 315 mm.
 8134. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 312 mm.
 5623. Busin Harbor, Burias Island. April 22, 1908. Length 330 mm.
 9176. Gigoso Point, Samar. July 28, 1909. Length 213 mm. (1729).
 9293. Murcielagos Bay, Mindoro. August 9, 1909. Length 393 mm.
 9334, 18586. Murcielagos Bay. August 21, 1909. Length 211 to 650 mm.
 7384. Port Caltom, Busuanga Island. December 15, 1908. Length 311 mm.
 7692. Ulugan Bay, Palawan Island. December 29, 1908. Length 350 mm.
 A680. Bumbum Island, vicinity of Darvel Bay, Borneo. September 25, 1909. Length 358 mm.
 A704, A705. Danawan Island, vicinity Sibuko Bay, Borneo. September 27, 1909. Length 448 to 475 mm.
 A765. Mabul Island, vicinity Sibuko Bay, Borneo. September 29, 1909. Length 550 mm.
 A995. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 335 mm.
 13386, 13387. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 210 to 230 mm.
 A1129, A1131. Kayoa Island. November 29, 1909. Length 393 to 580 mm.

Genus VARIOLA Swainson

- Variola* SWAINSON, Lardner's Cabinet Cycloped. (Nat. Hist. Animals), Fishes, vol. 2, 1839, p. 202. Type *Variola longipinna* SWAINSON, monotypic.
Louti FORSKÅL, Descript. Animal., 1775, p. 44. Type *Perca louti* FORSKÅL, by vernacular tautonym. (Inadmissible.)
Pseudoserranus KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 687. Type *Perca louti* FORSKÅL, monotypic.

Body oblong, compressed. Eyes lateral, moderate. One or 2 curved canines each side of mandible, besides pair in front of each jaw. Teeth in jaws villiform, on vomer and palatines and inner row in both jaws depressible. Preopercle with hind edge weakly serrated, lower edge entire. Opercle with 3 spines. Scales small, ctenoid, none on snout, suborbitals or maxillary. Dorsal spines 9, rays 14, soft dorsal ending in long point. Anal spines 3, rays 8, soft anal also ending in point. Caudal emarginate, angles pointed.

Indo-Pacific.

VARIOLA LOUTI (Forskål)

- Perca louti* FORSKÅL, Descript. Animal., 1775, pp. xi, 40. Djedda and Lohaja, Red Sea.—BONNATERRE, Tabl. Ichth., 1788, p. 133 (Red Sea).—GMELIN, Syst. Nat. Linn., vol. 1, 1789, p. 1318 (Arabia).—WALBAUM, Artedi Pisc., vol. 3, 1792, p. 338 (on FORSKÅL).
Bodianus louti SUCKOW, Naturgesch., vol. 4, 1799, p. 517 (Red Sea).—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 332 (Red Sea).—LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 278, 286 (Arabia).
Serranus louti RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 106, pl. 26, fig. 2 (Mohila).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 101 (Copang, Timor; Mauritius; Red Sea; Amboyna).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 1 (Zanzibar).—GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 2, pl. 1 (Red Sea, East Africa, Indian Ocean, New Hebrides, Society Islands, Tuamotus).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 8 (Manado, Celebes; Kordo, Mysore).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 459 (Paragua, Mindanao).

- Serranus luti* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 363 (Red Sea).
- Pseudoserranus louti* KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 687 (Red Sea); Fische Roth. Meer., 1884, p. 7.
- Variola louti* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 24 (Sumatra, Java, Celebes, Timor, Ternate, Batjan, Amboina, Waigiu, New Guinea); vol. 8, 1876-77, pl. (70) 288, fig. 3.—DAY, Fishes of India, pt. 1, 1875, p. 26, pl. 7, fig. 3; Fauna Brit. India, vol. 1, 1889, p. 459, fig. 143.—FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 521 (Padang, Sumatra).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 257 (Apia and Pago Pago).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 256 (Calayan).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 497 (Okinawa).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 198 (Sanguisiapo and Sulu, Sulu Archipelago; Lirung; Salomakie; Banda).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 33 (Samoa).—FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925, p. 13 (Wake Island).—FOWLER, Bishop Mus. Bull., No. 38, 1927, p. 13 (Christmas Island); Mem. Bishop Mus., vol. 10, 1928, p. 173, pl. 14, fig. B (Faté, Fanning Islands, Palmyra, Wake Island, Christmas Island, Apia, Society Islands, Apiang).
- Epinephelus louti* BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 173 (Red Sea, Zanzibar, Seychelles, Mauritius, Mascarenes, Manado, Amboina, Timor, Aneiteum, Samoa, Marshalls).
- Epinephelus (Variola) louti* PELLEGRIN, Bull. Soc. Zool. France, vol. 39, 1914, p. 224 (Nossi-Bé, Madagascar).
- Labrus punctulatus* LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1802, pp. 431, 477, pl. 17, fig. 2. The Great Ocean (Indo-Pacific).
- Serranus punctulatus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 367 (Moluccas, Waigiu, Ceylon); vol. 9, 1833, p. 435 (Mauritius).—QUOY and GAIMARD, Voy. Astrolabe, Zool., vol. 3, 1834, p. 654, pl. 3, fig. 2 (New Ireland).—GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 23.
- Serranus flavimarginatus* RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 109. Near Mohila.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 103 (copied).
- Variola flavimarginata* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 23 (Amboina).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 492 (Okinawa).
- Pseudoserranus louti* var. *flavimarginata* KLUNZINGER, Fische Roth. Meer., 1884, p. 7.
- Variola louti* var. *flavimarginata* WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 198 (Banda).
- Serranus phaenistomus* SWAINSON, Nat. Hist. Animals, Fishes, vol. 2, 1839, p. 201 (on *Serranus louti* RÜPPELL, pl. 26, fig. 2).
- Variola longipinna* SWAINSON, Nat. Hist. Animals, Fishes, vol. 2, 1839, p. 202 (on *Serranus louti* RÜPPELL, pl. 26, fig. 2).
- Perca irrorata* LICHTENSTEIN, Descript. Animal., Forster, 1844, p. 222. Saint Christian, Waitaho.
- Serranus melanotaenia* BLEEKER, Act. Soc. Sci. Ind. Néerland. (Amboina), vol. 2, 1857, p. 33. Amboina.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 504 (copied).
- Variola melanotaenia* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (11) 289, fig. 4.

Depth 3 to $3\frac{1}{4}$; head $2\frac{2}{5}$ to 3, width $2\frac{1}{5}$ to $2\frac{2}{5}$. Snout $3\frac{1}{2}$ to $3\frac{3}{5}$ in head from snout tip; eye $4\frac{2}{3}$ to $5\frac{3}{4}$, $1\frac{1}{4}$ to $1\frac{2}{5}$ in snout,

greater than interorbital; maxillary reaches opposite hind eye edge, expansion $\frac{3}{8}$ to $\frac{7}{8}$ in eye, length $2\frac{1}{10}$ to $2\frac{1}{6}$ in head from snout tip; teeth in villiform bands in jaws, inner of upper anteriorly and along all inner edge of mandible little enlarged, also outer upper series enlarged; pair of canines in front of each jaw and another close set pair on each mandibular ramus medianly; bands of small teeth on vomer and palatines; interorbital $6\frac{1}{5}$ to $7\frac{1}{2}$, level, scarcely convex; preopercle edge entire; opercular spines 3, median closer to lower which before uppermost. Gill rakers 7 to 10 + 14, $\frac{3}{5}$ of gill filaments, which equal eye; 6 to 8 above, and 5 or 6 below rudimentary.

Scales 83 to 120? in lateral line to caudal base and 8 to 12 more on latter; tubes 64 or 65 in lateral line to caudal base and 3 or 4 more on latter; 15 to 20 scales above, 30 to 40 below; 20 to 28 rows on cheek; scales minute on predorsal, breast, chest, and fin bases; snout, jaws, lips, maxillary, and branchiostegal region naked; with age maxillary expansion largely finely scaled; fins all finely scaled like body. Scales with 4 to 12 basal radiating striae; 26 to 30 apical denticles, with 4 to 6 transverse series; circuli fine.

D. IX, 13, 1 or 14, 1, ninth spine $2\frac{1}{2}$ to 3 in total head length, tenth ray 2 to $2\frac{3}{8}$; A. III, 8, 1, third spine $3\frac{4}{5}$ to 4, fifth ray $1\frac{2}{5}$ to $1\frac{7}{8}$; caudal 1 to $1\frac{1}{3}$, deeply lunate with produced points; least depth of caudal peduncle 3 to $3\frac{1}{4}$; pectoral $1\frac{2}{3}$ to $1\frac{3}{4}$; ventral $1\frac{2}{3}$ to 2.

Pale brownish generally, fins but little darker and everywhere with numerous small whitish dots, except on paired fins and lower surface of head; in alcohol dots often dusky or deep brown. Iris deep yellow. When fresh, body orange marked with rather small, numerous, rosy purple spots on body above. On lower surface spots pale rosy, some almost faded pale white. Dorsals, anals, and caudal spotted, last with dusky gray band close to edge.

Red Sea, East Africa, Zanzibar, Mauritius, Reunion, Madagascar, Mascarene Islands, Seychelles, Ceylon, India, East Indies, Philippines, Riu Kiu, Melanesia, Polynesia. A very handsome fish and variable in its coloration. According to Rüppell's figure of *Serranus louti* only the margin of the pectoral is yellow, though both Bleeker and Quoy and Gaimard show a plain or uniformly colored pectoral without any darker basal color. Jordan and Seale have figured their Samoan variety with the broad blackish band along the upper part of the side as a distinct species, *Variola flavimarginata*. We have three examples (42, A845 and A846) from the East Indian region of this variety. They have the dark band from the eye and along the back, also a dark blotch at the base of the upper caudal lobe.

A. 1527. Doc Can Island, Sulu Sea. January 7, 1910. Length 45 mm. Stomach contained *Holacanthus melanotoma* 80 mm. long and small serranid.

9077. Malhon Island, vicinity of Surigao Strait, between Samar and Leyte. July 27, 1909. Length 355 mm.

4733. Maricaban Island, Luzon. January 18, 1908. Length 280 mm. Marked with white flakes.
- S874. Near Palag Bay, Luzon. June 16, 1909. Length 300 mm.
19024. North West Verde Island. July 26, 1908. Length 140 mm.
22499. Opol, Mindanao Island. August 4, 1909. Length 163 mm. (755).
22928. Romblon. March 25, 1908. Length 66 mm.
- A588. Tara Island, Panpan Point, between Jolo and Tawi Tawi. September 20, 1909. Length 410 mm.
42. Tulnalutan Island, east of Zamboanga. September 9, 1909. Length 250 mm. (var. *flavimarginatus*).
- 5930, 6006. Zamboanga market. May 25 and 27, 1908. Length 335 to 352 mm. [110].
- A711, A712. Si Amil Island, vicinity of Darvel Bay, Borneo. September 27, 1909. Length 418 to 451 mm.
- A1318, A1319. Tifu Bay, Bouro Island. December 10, 1909. Length 315 to 443 mm.
- A1467, A1496. Libani Bay, Celebes. December 29, 1909. Length 240 to 332 mm.
- A845, A846. Talisse Island, north of Celebes. November 9, 1909. Length 264 to 353 mm. (var. *flavimarginatus*).
- A1172. Gane Road, Gillolo Island. December 1, 1909. Length 323 mm.
- A1556, A1558. Kwa Siang Bay, Formosa. January 25, 1910. Length 303 to 463 mm.

Genus CEPHALOPHOLIS Schneider

- Cephalopholis* SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 311. Type *Cephalopholis argus* SCHNEIDER, monotypic.
- Uriphaeton* SWAINSON, Nat. Hist. Animals, vol. 2, 1839, pp. 168, 202. Type *Uriphaeton microleptes* SWAINSON, monotypic.
- Enneacentrus* GILL, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 105. Type *Serranus outalibi* VALENCIENNES, orthotypic.
- Petrometopon* GILL, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 105. Type *Serranus guttatus* POEY, orthotypic.
- Menephorus* POEY, Ann. Lyc. Nat. Hist. New York, vol. 10, 1874, p. 50. Type *Serranus dubius* POEY, orthotypic.
- Phaetonichthys* BLEEKER, Verh. Kon. Akad. Wet. Amsterdam, vol. 14, ser. 2, 1874, p. 3 (name in synonymy). Type *Serranus phaeton* VALENCIENNES. Bleeker gives *Serranus phaeton* VALENCIENNES as the type of *Uriphaeton* SWAINSON, in Verh. Kon. Akad. Wet. Amsterdam, vol. 14, ser. 2, 1874, p. 3.
- Enneistius* JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 1143. Type *Bodianus acanthistius* GILBERT, monotypic.
- Ethaloperca* FOWLER, Journ. Acad. Nat. Sci. Philadelphia, vol. 12, ser. 2, 1904, p. 522. Type *Perca rogaa* FORSKÅL, orthotypic.

Body moderate, oblong. Maxillary with distinct supplemental bone. Inner jaw teeth depressible, hinged; canines more or less distinct in front of jaws. Scales small, mostly ctenoid. Top of head and soft dorsal scaly. Dorsal spines 9, soft rays moderate, 13 to 15. Anal spines 3, well developed, rays 7 or 8. Caudal rounded to lunate. Pectoral rounded, symmetrical, median rays longest.

Small brilliant groupers, rather abundant in tropical seas. They differ from *Serranus* chiefly in the presence of 9 spines, instead of 11.

ANALYSIS OF THE SPECIES

- a*¹. Caudal rounded.
- b*¹. ENNEACENTRUS. Body without transverse dark bands; usually with blue or white spots.
- c*¹. Caudal without dark oblique band above and below.
- d*¹. No net work of blue on head; fins uniformly pale or light in color.
- e*¹. Orange or pink, with or without blue dots on front part of back; vertical fins sometimes with dark edges.-----aurantius
- e*². Red or pink, with large blue dark edged spots, few or absent on paired fins.-----miniatus
- d*². Red or reddish, with variable bluish net work on head; variably small whitish or bluish spots on body and fins.-----sonnerati
- c*². Caudal with dark oblique band above and another below.
- f*¹. Red or red brown, uniform or with vermilion or bluish white dots; pectoral and vertical fins usually dark.-----urodelus
- f*². Yellowish or olive, spotted with red; variable dark postocular band; 1 or 2 black spots on tail behind dorsal.-----leopardus
- b*². CEPHALOPHOLIS. Body with 6 to 8 dark transverse bands; body usually with blue or whitish spots.
- g*¹. Body without longitudinal blue lines.
- h*¹. Anal rays 8.
- i*¹. Variably uniform brown; with or without blue dots on head and body anteriorly; fins dark, dorsal and anal edged yellow.-----pachycentron
- i*². Red, dotted all over with blue.-----cyanostigma
- h*². Anal rays 7.
- j*¹. Dark brown or black anteriorly, paler posteriorly; small rounded blue black-ringed spots everywhere; spinous dorsal edged yellow and soft fins with light edge.-----argus
- j*². Red, dotted nearly all over with blue and sometimes blue lines on head; 4 large black blotches on back at dorsal bases and 2 more behind dorsal.-----sexmaculatus
- g*². Body usually with many blue longitudinal lines; spinous dorsal membranes edged black.-----boenack
- a*². AETHALOPERCA. Caudal truncate or emarginate; anal rays 9; coloration dark.
- k*¹. Uniform dusky to blackish; inside mouth orange; tip of dorsal and hind caudal edge whitish; caudal truncate.-----rogea
- k*². Largely uniformly dusky brown; 4 obscure bluish longitudinal lines on head; pectoral variably and broad border of soft dorsal whitish; caudal emarginate.-----albomarginatus

CEPHALOPHOLIS AURANTIUS (Valenciennes)

- Serranus aurantius* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 305. Seychelles.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 118 (copied).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 461 (Cebu).
- Epinephelus aurantius* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873–76, p. 37, pl. 20 (298), fig. 3 (Sumatra, Celebes, Ternate, Batjan, New Guinea).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 60, pl. 9, fig. 5.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 193 (North Celebes and Louisiades).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 71, pt. 1, 1907, p. 125 (Gischin, South Arabia).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 201 (Banca).
- Cephalopholis aurantius* FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 220 (Delagoa Bay); Mem. Bishop Mus., vol. 10, 1928, p. 175 (compiled).
- Serranus roseus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 306. Tahiti.
- Serranus analis* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 307. New Ireland; vol. 6, 1830, p. 514 (note).—LESSON, Voy. Coquille, Zool., vol. 2, pt. 1, 1830 (1831), p. 235 (New Ireland).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 123 (copied).—GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 23.
- Epinephelus analis* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873–76, p. 38 (Sumatra and Celebes); vol. 8, 1876–77, pl. (51) 329, fig. 5.
- Serranus rufus* HOMBRON and JACQUINOT, Voy. Astrolabe, Zool., vol. 3, 1853, p. 35, pl. 1, fig. 4. No locality.
- Serranus sonnerati* (part) GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 122 (Louisiades).
- Epinephelus sonnerati* (part) BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 472 (Fowler's reference to Delagoa Bay example).
- Serranus leopardus* (part) GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 4.
- Bodianus indebilis* FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 521, pl. 17, lower figure. Padang, Sumatra.
- Cephalopholis obtusauris* EVERMANN and SEALE, Bull. Bur. Fisher., vol. 22, 1906 (1907), p. 77, fig. 12. Bacon.—SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 243 (Zamboanga),

Depth $2\frac{4}{5}$; head $2\frac{2}{3}$, width $2\frac{1}{3}$. Snout 4 in head from upper jaw tip; eye $5\frac{1}{2}$, $1\frac{1}{2}$ in snout, greater than interorbital; maxillary reaches opposite hind eye edge, expansion $1\frac{1}{8}$ in eye, length 2 in head from snout tip; teeth small, inner depressible, outer strong erect teeth in each jaw but little enlarged; 2 canines in front of each jaw; interorbital $7\frac{1}{2}$, nearly level; upper opercular spine most distant, lowest most advanced. Gill rakers 6+16, lanceolate, $\frac{2}{5}$ of eye; 4 above and 4 below rudimentary.

Scales 72 in lateral line to caudal base; tubes 40 in lateral line to caudal base; 15 scales above lateral line, 29 below, 60 predorsal scales forward to front nostril. Vertical fins covered with small scales basally over rayed portions. Opercle with fine scales. Lateral line arched nearly parallel with back.

D. IX, 15, 1, fourth spine $3\frac{1}{8}$ in total head length, seventh ray 3; A. III, 9, 1, second spine $2\frac{7}{8}$, sixth ray $2\frac{1}{3}$; caudal $1\frac{1}{2}$, convex; least depth of caudal peduncle $3\frac{1}{2}$; pectoral $1\frac{2}{3}$; ventral 2.

Orange, many scales on body above pale dusky. Head and front of back with small, round, golden spots. Iris deep golden orange. Brown spot on soft dorsal edge at thirteenth ray equals pupil. Anal and ventral with narrow dusky edges. Caudal with narrow whitish line close to and concurrent with fin edge. Pectoral deep golden orange.

Southern Arabia, Portuguese East Africa, Seychelles, Mascarene Islands, East Indies, Philippines, Melanesia, Polynesia. A handsome species which we chiefly define by its color, which light red or orange, sometimes or not with scattered blue dots on the head and front of the back though it never shows the bluish network on the head as in *Cephalopholis sonnerati* which is also a much larger species. Fowler reported an example of *Cephalopholis aurantius* from Dalogoa Bay, 333 mm. long which shows 123 scales in lateral line to the caudal base. We still believe it to be that species though Barnard has placed it with *C. sonnerati*, pointing out that "his description differs from that of Boulenger, mainly in the scale counts, though it should be noted that Fowler's scale counts, especially that of the scales in a transverse direction, are often considerably greater than those of Boulenger and other authors." These counts are, however, probably not greater than counts which may be made from the materials of "Boulenger and other authors" provided they are counted above the lateral line to the origin of the spinous dorsal and below the lateral line to the origin of the spinous anal, as this is the way they are made in the present work. In this case the matter is simply a method of counting, and one which we have found most satisfactory. The count of the scales in the lateral line is another matter, and though it is true they are greatly in excess of any given for the species, the specimen is also apparently the largest hitherto reported and therefore count placed on record to show the greatest number observed. The pores in the lateral line are 73 to the caudal base and are a corresponding increase. The species is subject to still greater range in variation than Boulenger or Barnard give. We also believe *Bodianus indelebilis* Fowler a synonym, as it shows scales 72+; tubes 40, scales above 15, 29 below, and its color orange with head and back in front with small round golden spots. *Cephalopholis obtusauris* Evermann and Seale is another synonym, based on a slightly larger uniform example. Our description from the type of *Bodianus indelebilis*, a small example obtained at Padang and now in the Academy of Natural Sciences of Philadelphia.

CEPHALOPHOLIS MINIATUS (Forskål)

- Perca miniata* FORSKÅL, Descript. Animal., 1775, pp. xii, 41. Djedda and Lohaja, Red Sea.—BONNATERRE, Tabl. Ichth., 1788, p. 131 (on FORSKÅL).—GMELIN, Syst. Nat. Linn., vol. 1, 1789, p. 1317 (Arabia).—WALBAUM, Artedi Pisc., vol. 3, 1792, p. 338 (on FORSKÅL).
- Bodianus miniatus* SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 332 (Red Sea).—FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 522 (Padang, Sumatra).
- Diacope miniata* CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 433 (on FORSKÅL).
- Serranus miniatus* RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 106, pl. 26, fig. 3 (Red Sea).—PETERS, Arch. Naturg., 1855, p. 235 (Mozambique).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 118 (no locality).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 3 (Aden).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 679 (Kosier).—GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 5, pl. 5 (Polynesia, Samoa).—DAY, Fishes of India, pt. 1, 1875, p. 24, pl. 6, fig. 2.—PETERS, Monatsb. Akad. Wiss. Berlin, 1876, p. 435 (Mauritius).—KLUNZINGER, Fische Roth. Meer., 1884, p. 4 (Koseir).—DAY, Fauna Brit. India, vol. 1, 1889, p. 456.—PEARSON, Rep. Gov. Marine Biol. Ceylon, 1912-13, pt. 4, p. E13.
- Cromileptes miniatus* SWAINSON, Nat. Hist. Animals, Fishes, vol. 2, 1839, p. 201 (on RÜPPELL, pl. 26, fig. 3).
- Epinephelus miniatus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 41 (Sumatra, Java, Celebes, Flores, Ternate, Batjan, Obi Major, Buru, Ceram, Amboina, Waigiu, New Guinea).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 52.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 191 (Zanzibar, Mauritius, Ceylon, Madras, Andamans, North Celebes, Amboina, Apamana, Samoa).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, Math.-Naturwiss. Kl., vol. 71, pt. 1, 1907, p. 124 (Bah-Hâf, Socotra).—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 13, 1907, p. 204 (Tuléar, Madagascar).—GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol. 6, 1908-10, p. 215 (Natal).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 200 (Beo; Salomakie; Salayer; Banda; Tiur Island; Pepla Bay, Rotti).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 474 (Natal coast).
- Cephalopholis miniatus* FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 252 (Padang examples).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 256 (Calayan).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 221 (Natal); Bishop Mus. Bull. No. 38, 1927, p. 13 (Fanning Island); Mem. Bishop Mus., vol. 10, 1928, p. 175 (Shortland and Ebon Islands).
- Pomacentrus burdi* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 506, 510. Arabia.
- Serranus cyanostigma* (not VALENCIENNES 1828) VALENCIENNES, Règne Animal III. Cuvier, 1836, pl. 8, fig. 2.
- Perca maculata* (FORSTER) LICHENSTEIN, Descr. Animal., 1844, p. 220. St. Christian Island, Waitako (not *Perca maculata* LINNAEUS).
- Cephalopholis maculatus* SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 235, fig. 5. Zamboanga.
- Serranus cyanostigmatoides* BLEEKER, Verh. Batav. Genootsch. (Percoid.), vol. 22, 1849, p. 31. Batavia, Java.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 117 (Amboyna).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 3 (Zanzibar).—MEYER, An. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 9 (North Celebes).

Epinephelus cyanostigmatoides BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (5) 283, fig. 3.

Epinephelus melas (not PETERS) GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol 6, pt. 3, 1909, p. 220 (Natal).

Cephalopholis boninius JORDAN and THOMPSON, Mem. Carnegie Mus., vol. 6, No. 4, 1914, p. 248, pl. 29, fig. 7. Bonin Islands.

Depth $2\frac{2}{3}$ to 3; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{3}$ to $2\frac{3}{5}$. Snout $3\frac{5}{8}$ to $4\frac{1}{2}$ in head from snout tip; eye $5\frac{1}{5}$ to $7\frac{1}{4}$, $1\frac{1}{5}$ to 2 in snout, greater than interorbital in width, $1\frac{1}{10}$ with age; maxillary reaches below hind rim of eye or little beyond, expansion equals or slightly exceeds eye, length 2 to $2\frac{1}{10}$ in head from snout tip; teeth in bands in jaws, inner

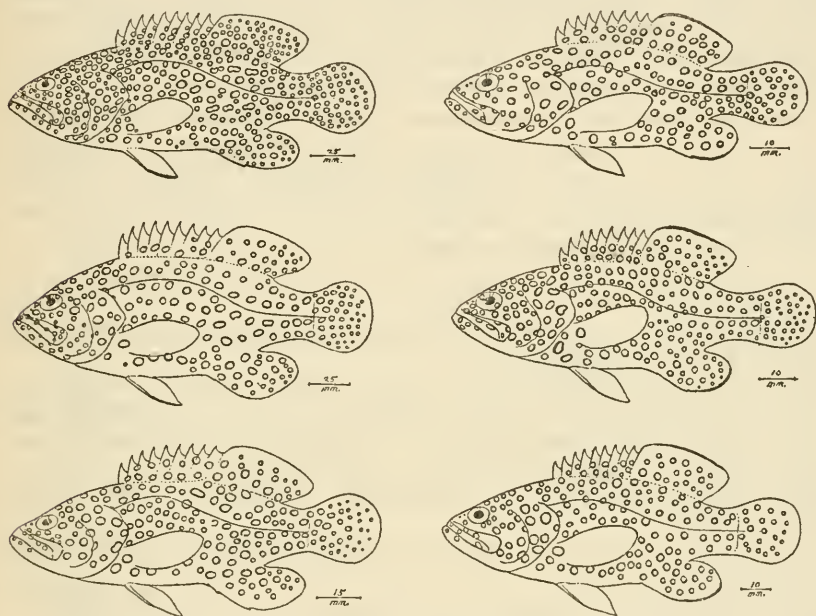


FIGURE 8.—*CEPHALOPHOLIS MINIATUS* (FORSKÅL), VARIATION

depressible and edges of each jaw with outer row little larger; mandible with 6 rows in front narrowing to single inner row posteriorly; pair of canines in front of each jaw; minute teeth on vomer and palatines; interorbital $6\frac{1}{4}$ to $6\frac{3}{5}$, convex; preopercle edge minutely and unevenly serrated; lower opercle spine little more advanced and upper more distant from median. Gill rakers 8 or 9 + 14 to 17, little longer than gill filaments or one-half of eye; 5 to 7 above and below rudimentary.

Scales 90 to 103 in lateral line to caudal base and 15 to 18 more on latter; tubes 48 to 52 in lateral line to caudal base and 3 or 4 more on latter; 14 to 17 scales above lateral line, 27 to 34 below, 54 to 56 predorsal, 24 to 28 rows across cheek; basal portions of fins more or less covered with small scales; body scales without fine

auxiliary basal scales; maxillary with upper $\frac{3}{5}$ of expansion finely scaled. Scales with 7 or 8 basal radiating striae; 31 to 51 apical denticles, with 3 or 4 transverse series of basal elements; circuli fine.

D. IX, 15, 1, or 14, 1, fourth spine $3\frac{1}{4}$ to 4 in total head length, twelfth ray $2\frac{1}{3}$ to $2\frac{7}{8}$; A. III, 9, 1, third spine $3\frac{1}{5}$ to $3\frac{1}{3}$, sixth ray $2\frac{1}{3}$ to $2\frac{3}{5}$; caudal $1\frac{3}{5}$ to $1\frac{4}{5}$, rounded; least depth of caudal peduncle $2\frac{3}{5}$ to 3; pectoral $1\frac{1}{2}$ to $1\frac{3}{5}$; ventral $1\frac{7}{8}$ to $2\frac{1}{8}$.

Orange red, little faded, lower surface little lighter or brighter. Except paired fins, head below and abdomen, body with small dark brown ringed or ocellated blue spots. Eye yellowish, with several brown spots. Inside gill opening more or less tinged with orange. Margins of vertical fins, also of ventrals, narrowly blackish brown. Upper and lower edges of caudal with narrow whitish edges, but not extending to middle rays. Paired fins deep orange red.

Red Sea, Zanzibar, Mozambique, Natal, Mauritius, Madagascar, India, Ceylon, Andamans, East Indies, Philippines, Melanesia, Micronesia, Polynesia. A handsome species and variable. *Cephalopholis maculatus* Seale and Bean and *C. boninius* Jordan and Richardson are only slight variants.

8132, 8133. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 261 to 356 mm.

13503, 13710, 17708, 17769, 18271. Alimango Bay, Burias Island. March 5, 1909. Length 155 to 225 mm.

8276, 8281. Canmahala Bay, Luzon. March 11, 1909. Length 275 to 355 mm.

21589. Guiniyan Island, east coast Luzon. June 4, 1909. Length 180 mm.

9481. Guntao Island, Palawan Passage. December 20, 1908. Length 216 mm.

4860. Jolo market. February 12, 1908. Length 303 mm.

18582. Malanipa Island, east of Zamboanga. September 8, 1909. Length 158 mm.

11123, 11260. Pasacao Island, Ragay Gulf, Luzon. March 9, 1909. Length 130 to 212 mm.

8203, 8204. Port Busin, Burias Island. March 8, 1909. Length 243 to 283 mm.

11040. Port Maricaban, southern Luzon. July 21, 1908. Length 186 mm.

7343. Tara Island, Mindoro Strait. December 14, 1908. Length 255 mm.

4954. Tawi Tawi Group, Sulu Archipelago. February 21, 1908. Length 325 mm.

17268. Tayabas River, Marinduque Island. February 25, 1909. Length 157 mm.

6485, 6486. Tilig, Lubang Island, vicinity southern Luzon. July 15, 1908. Length 207 to 277 mm.

A467, A468. Tulualutan Island, east of Zamboanga. September 9, 1909. Length 245 to 246 mm.

A570, 6648. Tutu Bay, Jolo. September 19, 1909. Length 200 to 270 mm.

6635. Varadero Bay, Mindoro. July 23, 1908. Length 300 mm.

5932. Zamboanga market. May 25, 1908. Length 277 mm.

17575. Danawan Island, vicinity Darvel Bay, Borneo. September 27, 1909. Length 142 mm.

A760. Sipadan Island, Sibuko Bay vicinity, Borneo. September 28, 1909. Length 241 mm.

A882, 13035. Limbe Strait, vicinity of Strait Island, north of Celebes. November 1, 1909. Length 216 to 341 mm.

13123. Powati Harbor, Makyan Island, Molucca Passage. November 28, 1909. Length 158 mm.
13534. Makyan Island. November 29, 1909. Length 114 mm.
19026. North West Verde Island. July 22, 1908. Length 135 mm.
9957. Doc Can Island, Sulu Sea. January 7, 1910. Length 200 mm.
6952. West coast Sabtan Island, China Sea, vicinity Formosa. November 8, 1908. Length 293 mm.

CEPHALOPHOLIS SONNERATI (Valenciennes)

- Serranus sonnerati* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 299. Pondicherry and Ceylon.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 122 (Sumatra and Louisiades).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 3 (not pl. 3, fig. 1).—DAY, Fishes of India, pt. 1, 1875, p. 25, pl. 7, fig. 1 (Madras).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 149 (Palaboen, Java).—DAY, Fauna Brit. India, vol. 1, 1889, p. 457, fig. 142 (east coast of Ceylon and Madras).—BOULENGER, Proc. Zool. Soc. London, 1889, p. 238 (Muscat).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 223 (Natal).
- Serranus (Epinephelus) sonneratii* ZUGMAYER, Abh. Bayer. Akad. Wiss., Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 9 (Oman).
- Epinephelus sonnerati* BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 187 (Mauritius, Zanzibar, Seychelles, Muscat, Ceylon, Madras, Pelew Islands, Kingsmills, Samoa, Australia).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, Math.-Naturwiss. Kl., vol. 71, pt. 1, 1907, p. 124 (Bah Háf, Socotra).—REGAN, Ann. Natal Mus., 1908, p. 224 (Durban Bay).—GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol. 6, 1908–10, p. 214 (Durban Museum; Natal).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 199 (Sanguisiapo, Sulu Archipelago; Banda).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 472 (Natal coast; Delagoa Bay).
- Cephalopholis sonnerati* SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 243 (Zamboanga).—FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925, p. 14 (Wake Island).—FOWLER, Bishop Mus. Bull., No. 38, 1927, p. 13 (Fanning Island); Mem. Bishop Mus., vol. 10, 1928, p. 174 (Wake Island and Apiang).
- ?*Labrus guaza* (part) LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1802, p. 501, pl. 27, fig. 1.
- ?*Serranus zananella* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 304. Fort-Dauphin, Madagascar (on LACÉPÈDE).
- ?*Epinephelus zunanella* BLEEKER, Nederland. Tijdschr. Dierk., vol. 1, 1863, p. 344 (Madagascar).
- ?*Serranus zunanella* ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 460 (Mindoro, Cebu, Luzon, Cavite).
- Serranus pachycentrum* (not VALENCIENNES) GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 116 (Ceylon).
- Serranus erythraeus* (not VALENCIENNES) PLAYFAIR, Fishes of Zanzibar, 1866, p. 2, pl. 1, fig. 1 (Seychelles).
- Serranus leopardus* (part) GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 4.
- Epinephelus janthinopterus* BLEEKER, Verh. Akad. Wet. Amsterdam, vol. 14, No. 2, 1874, p. 40. Macassar, Celebes; Atlas Ichth. Ind. Néerland., vol. 7, 1873–76, p. 36 (Celebes); vol. 8, 1876–77, pl. (54) 332, fig. 5.

Depth $2\frac{3}{5}$ to $2\frac{3}{4}$; head $2\frac{3}{5}$ to $2\frac{3}{4}$, width $1\frac{7}{8}$ to $2\frac{1}{2}$. Snout $3\frac{1}{3}$ to $3\frac{2}{3}$ in head from snout tip; eye $6\frac{1}{8}$ to 7, $1\frac{1}{2}$ to 2 in snout, slightly greater than interorbital in young to $1\frac{1}{8}$ in interorbital with age;

maxillary extends back slightly beyond eye, expansion 1 to $1\frac{1}{8}$ in eye, length 2 to $2\frac{1}{8}$ in head from snout tip; teeth in villiform bands in jaws, with some inner front upper ones elongated and depressible, outer maxillary row enlarged and wide set pair of upper front canines; lower teeth in 3 or 4 series anteriorly, narrowing posteriorly to 2 series, also inner row longest and hinged and pair of front canines closer than upper; small band of fine teeth on vomer and palatines, none on tongue; interorbital $6\frac{1}{5}$ to $6\frac{2}{3}$, slightly convex; preopercle edge minutely serrated, with few serrae at angle trifle enlarged. Gill rakers 9 + 13, lanceolate, little longer than gill filaments or $1\frac{1}{2}$ in eye; 7 upper and 5 lower rudimentary.

Scales 104 to 117 in lateral line to caudal base and 10 to 13 more on latter; tubes 62 to 70 in lateral line to caudal base and 10 to 12 more on latter; 22 or 23 above lateral line, 35 to 38 below, 62 to 68 predorsal forward opposite hind nostril, 33 rows across cheek to preopercle angle; fins all with fine scales over greater portions basally; moderate patch of very small scales over upper half of maxillary. Scales with 4 basal radiating striae; 25 to 48 apical denticles with 3 or 4 transverse series of basal elements; obsolete rugosities in young; circuli fine.

D. IX, 15, 1, or 14, 1, third spine $3\frac{2}{5}$ to $3\frac{1}{2}$ in total head length, eleventh ray $2\frac{1}{5}$ to $2\frac{1}{3}$; A. III, 9, 1, third spine $3\frac{1}{4}$ to $3\frac{2}{5}$, seventh ray $2\frac{1}{8}$ to $2\frac{1}{5}$; caudal $1\frac{2}{3}$ to $1\frac{3}{4}$, convex behind; least depth of caudal peduncle $2\frac{2}{5}$ to $2\frac{4}{5}$; pectoral $1\frac{1}{2}$ to $1\frac{3}{5}$; ventral $1\frac{3}{4}$ to $1\frac{1}{2}$.

Brown or pale yellowish brown, head often darker than rest of body. Some examples show head and all anterior part of body finely spotted paler, spots all greater in diameter than interspaces. Often chest, prepectoral and abdomen pale spots greatly larger than on head and therefore fewer. Sometimes body and fins with small crowded gray white spots, often ill-defined to variably distinct in preserved examples.

Arabia, Zanzibar, Delagoa Bay, Natal, Madagascar, Mauritius, Seychelles, India, Ceylon, East Indies, Philippines, Australia, Melanesia, Micronesia, Polynesia. Boulenger gives a maximum length of 540 mm. though we have no examples so large. Most of our specimens pale and in alcohol the markings only variably distinct.

6290, 6291. Manila market. June 12, 1908. Length 340 to 377 mm.

5928. Zamboanga market. May 25, 1908. Length 277 mm.

5989, 5996. Zamboanga market. May 26, 1908. Length 228 to 342 mm.

9398. Zamboanga market. September 7, 1909. Length 338 mm.

A800. Zamboanga market. October 9, 1909. Length 312 mm.

CEPHALOPHOLIS URODELUS (Schneider)

Percam urodetam (FORSTER) SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 333. St. Christina, Waitaho.

Perca urodeta (FORSTER) LICHTENSTEIN, Descr. Animal., 1844, p. 221 (St. Christina).

- Serranus urodelus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 306 (Tahiti); vol. 6, 1830, p. 513 (Ulea).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 122 (India and Amboyna); Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 3, pl. 3, fig. A (Society, Kingsmills, Hervey, Tuamotu and Solomon Islands, East Indies); Cruise of Curaçoa, Brenchley, 1873, p. 409 (Solomon Islands), p. 410 (Misol, Moluccas).—MARTENS, Preuss. Exp. Ost-Asien, vol. 1, 1876, p. 385 (Amboina).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 9 (North Celebes).
- Epinephelus urodelus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 41 (Sumatra, Cocos, Nias, Java, Celebes, Sangir, Ternate, Obi major, Amboina, New Guinea); vol. 8, 1876-77, pl. (43) 321, fig. 2.—STREETS, Bull. U. S. Nat. Mus., No. 7, 1877, p. 91 (Fanning Islands).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 192 (Mysol, Amboina, Solomons, Aneiteum, Micronesia, Mauritius, Zanzibar, Seychelles, Sumatra).—JORDAN and SNYDER, Annot. Zool. Japon., vol. 3, 1891, p. 75 (Riu Kiu).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 200 (Binongka Island, Banda Island).
- Epinephelus urodelus* var. *urodelus* STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 414 (Ternate).
- Cephalopholis urodelus* SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 243 (Zamboanga).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 498 (Okinawa).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 175 (Society Islands, Gilbert Islands, Ebon Island, Nukuhiva, Mangareva, Palmyra, Tuamotus, Tahiti, Fanning Islands, Apia, Jaluit, Tempe).
- Bodianus miniatus* (part) SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 333.
- Serranus erythraeus* VALENCIENNES, Hist. Nat. Poiss., vol. 6, 1830, p. 516. Mauritius.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 116 (copied).—JATZOW and LENZ, Abh. Senckenberg. Naturf. Ges., vol. 21, 1889, p. 498 (Aldabra).
- Serranus erythrurus* MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 9 (Kordo, Mysore).
- Epinephelus erythraeus* SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 57, pl. 10, fig. 1.
- Serranus sonnerati* (part) GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 122 (Sumatra).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 3, pl. 3, fig. 1.
- Cephalopholis sonnerati* SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 498 (Okinawa).
- Epinephelus miltostigma* BLEEKER, Verh. Kon. Akad. Wet. Amsterdam, vol. 14, No. 2, 1874, p. 43. Amboina; Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 37 (Amboina); vol. 8, 1876-77, pl. (52) 330, fig. 5.
- Epinephelus playfairi* BLEEKER, Verh. Kon. Akad. Wet. Amsterdam, vol. 18, No. 3, 1879, p. 3. Mauritius.

Depth $2\frac{7}{8}$ to $3\frac{1}{5}$; head $2\frac{1}{2}$ to $2\frac{3}{4}$, width $1\frac{7}{8}$ to $2\frac{2}{5}$. Snout 4 to $4\frac{2}{5}$ in head from snout tip; eye $4\frac{1}{3}$ to 6, 1 to $1\frac{3}{5}$ in snout, subequal with interorbital; maxillary extends beyond eye, about half eye diameter with age, expansion 1 to $1\frac{1}{8}$ in eye, length $1\frac{1}{5}$ to 2 in head from snout tip; teeth fine, conic, with pair of upper, wide set, front canines, often double and inner rows depressible with anterior longer; lower teeth similar, only inner longer, hinged, with three or four rows along sides of jaws, pair of front canines small and closer than upper; bands of fine teeth on vomer and palatines, none on

tongue; nostrils about equal; interorbital $5\frac{3}{4}$ to 6, slightly convex; preopercle edge feebly serrate, serrae obsolete with age; opercular spines 3, upper most advanced and lower nearer median. Gill rakers $8+15$, lanceolate, robust, equal gill filaments or $2\frac{1}{4}$ in eye; 6 above and 5 below rudimentary.

Scales 90 to 93 in lateral line to caudal base and 10 to 15 more on latter; tubes 54 to 56 in lateral line to caudal base and 5 or 6 more on latter; 17 or 18 scales above lateral line, 28 to 30 below, 53 to 66 predorsal forward to snout end, 25 to 27 rows obliquely across cheek to preopercle edge; scales on head and body anteriorly with fine auxiliary basal scales, little distinct on hind half of body; upper half of maxillary expansion finely scaly, with 16 to 18 transverse rows. Scales with 7 or 8 basal radiating striae; 36 to 44 apical denticles; circuli moderate.

D. IX, 14, I, or 15, I, fourth spine $2\frac{4}{5}$ to 4 in total head length, twelfth ray $2\frac{1}{3}$ to $2\frac{3}{5}$; A. III, 9, I, second spine $2\frac{2}{3}$ to $3\frac{1}{8}$, fifth ray 2 to $2\frac{1}{3}$; caudal $1\frac{3}{5}$ to $1\frac{4}{5}$, convexly rounded behind; least depth of caudal peduncle $2\frac{3}{4}$ to $3\frac{1}{4}$; pectoral $1\frac{1}{4}$ to $1\frac{1}{2}$; ventral $1\frac{4}{5}$ to $2\frac{1}{5}$.

In alcohol dark brown above, little paler below or on breast and belly. Iris brown. Dorsals dark brown, mottled with deep gray on soft fin. Anal similar. Caudal largely or over median area dark brown mottled with dark gray, oblique whitish line over upper and lower rays and along upper and lower edges, leaving intermediate brown region paler, none of white lines touching one another on hind caudal edge. Paired fins pale brown or yellowish, usually with narrow dark edges to ventrals.

Zanzibar, Mauritius, Seychelles, India, East Indies, Philippines, Riu Kiu, Melanesia, Micronesia, Polynesia. Boulenger gives the length 240 mm. though none of our specimens so large. Also all have the white oblique bands on the caudal, a character by which the species may be easily distinguished.

16363. Balicuatro Islands, Biri Channel, east coast Luzon. June 1, 1909.

Length 123 mm.

17429, 17430. Bulan Island, Samales Group. September 13, 1909. Length 125 to 157 mm.

9349, 9350, 20097. Cagayan, Jolo. January 8, 1909. Length 127 to 194 mm.

4678 (D. 5110). Corregidor Light, Luzon. January 15, 1908. Length 195 mm.

19030. Dasol Bay, West Coast Luzon. May 8, 1909. Length 118 mm.

4636. Grande Island Reef, Subig Bay. January 8, 1908. Length 130 mm.

6045, 6047, 21042. Little Santa Cruz Island. May 28, 1908. Length 130 to 218 mm. (94).

4686, 13990. Nasugbu, China Sea off southern Luzon. January 16, 1908. Length 156 to 218 mm.

7085, 7086, 18171. Port San Pio Quinto, Camiguin Island, China Sea, vicinity Batanes. November 11, 1908. Length 174 to 225 mm.

9311, 19071. Silino Island, vicinity northern Mindanao. August 10, 1909. Length 203 to 235 mm.

- One example. Taganak Island, off southern Luzon. January 7, 1908. Length 144 mm. (1080).
14306. Teomabal Island, vicinity Jolo. September 18, 1909. Length 126 mm.
- 7124 and 7125. West coast of Palaui Island. November 18, 1908. Length 152 to 198 mm.
21334. Birabirahan Island, off Borneo. December 31, 1909. Length 93 mm.
- 16425, 16427. Danawan and Si Amil Islands, vicinity Sibuko Bay, Borneo. September 27, 1909. Length 157 to 178 mm.
17309. Sipadan Island, vicinity Sibuko Bay, Borneo. September 28, 1909. Length 175 mm.
18252. Tomahu Island, vicinity of southern Bouro. December 11, 1909. Length 90 mm.
13486. Basa Reef, Gulf of Boni, Celebes. December 17, 1909. Length 171 mm.
16231. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 154 mm.
14866. Dodepo Island, Gulf of Tomini, Celebes. November 16, 1909. Length 85 mm.
- 18332, 18337. West of Malibagu Point, Celebes. November 21, 1909. Length 175 to 197 mm. (2062).
13212. Doworra Island. December 2, 1909. Length 169 mm.
13121. Powati Harbor, Makyan Island. November 28, 1909. Length 195 mm.
- 13507, 13509. Gomomo Island, Pitt Passage. December 3, 1909. Length 125 to 170 mm.

CEPHALOPHOLIS LEOPARDUS (Lacépède)

Labrus leopardus LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1802, pp. 450, 518, pl. 30, fig. 1. Great Equatorial Ocean (Indo-Pacific).

Serranus leopardus VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1827, p. 336 (on LACÉPÈDE).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 123 (copied); Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 4, pl. 3, fig. B (East Africa, Seychelles, Samoa, East Indies, Society Islands).—DAY, Fishes of India, pt. 1, 1875, p. 25, pl. 6, fig. 4; Fauna Brit. India, vol. 1, 1889, p. 457.—PETERS, Monatsb. Akad. Wiss. Berlin, 1876, p. 435 (Mauritius).

Plectropoma leoparda RICHARDSON, Ichth. China, Japan, 1846, p. 230 (copied).

Epinephelus leopardus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 44, pl. (10) 288, fig. 2 (Sumatra, Sangir, Ternate, Batjan, Flores, Amboina).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 57, pl. 10, fig. 1.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 195 (Amboina, Louisiades, Tahiti).—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 414 (Batjan).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 201 (Banda Island, Feer Hoch Kei).

Cephalopholis leopardus JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 256 (Calayan).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 176 (Arhno, Apia, Society Islands).

Serranus zanana VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 339. No locality, "rapportée par Commerson."—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 123 (Amboyna).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 9 (North Celebes).

Epinephelus zanana BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (10) 288, fig. 2.

Serranus spilurus VALENCIENNES, Hist. Nat. Poiss., vol. 9, 1833, p. 433. Mauritius.

Serranus homfrayi DAY, Proc. Zool. Soc. London, 1870, p. 678. Port Blair, Andaman Islands.

Depth $2\frac{2}{3}$ to $2\frac{3}{4}$; head $2\frac{2}{5}$ to $2\frac{4}{5}$, width $2\frac{1}{2}$ to $2\frac{7}{8}$. Snout $4\frac{1}{4}$ to $4\frac{7}{8}$ in head from snout tip; eye $4\frac{1}{4}$ to $5\frac{1}{2}$, greater than snout in young to $1\frac{2}{5}$ with age, greater than interorbital in young to equal with age; maxillary extends beyond eye, at least half an eye diameter with age, expansion $1\frac{1}{5}$ to $1\frac{1}{3}$ in eye, length 2 to $2\frac{1}{10}$ in head from snout tip; teeth in bands in jaws, slightly enlarged outer erect upper row; some long inner front upper depressible teeth; lower laterals in 4 rows narrowing to 2 rows posteriorly and entire inner row long and depressible; pair of small canines in front of each jaw, often duplicated; narrow band of fine teeth on vomer and each palatine; interorbital 6 to $8\frac{1}{2}$, nearly level; hind preopercle edge minutely serrated, obsolete or entire with age; upper opercle spine in advance, median closer to lower. Gill rakers 6 + 14, obtusely lanceolate, slightly less than gill filaments or $2\frac{1}{4}$ in eye; 5 upper or lower on each branch rudimentary.

Scales 70 to 77 + 11 to 15 in lateral line; pores 43 to 49 + 3 or 4; predorsal 47 to 90 scales; 13 to 16 above, 25 to 27 below; 24 to 26 rows across cheek; maxillary naked in young, with age terminal patch of fine scales $\frac{1}{4}$ maxillary expansion; fins all more or less finely scaled basally; body scales without fine auxiliary basal scales. Scales with 6 to 10 basal radiating striae; 38 to 51 apical denticles with 4 to 6 transverse series; circuli fine.

D. IX, 14, 1 or 15, 1, fourth spine $2\frac{7}{8}$ to $3\frac{1}{10}$ in total head length, twelfth ray $2\frac{1}{3}$ to 3; A. III, 9, 1, second spine $2\frac{4}{5}$ to 3, third ray $1\frac{1}{10}$ to $2\frac{2}{5}$; caudal $1\frac{3}{5}$ to $1\frac{7}{8}$, convex behind; least depth of caudal peduncle $3\frac{1}{4}$ to $3\frac{3}{5}$; pectoral $1\frac{1}{4}$ to $1\frac{1}{3}$; ventral $1\frac{7}{8}$ to 2.

In alcohol light brown generally, finely spotted with darker, appearing rather as mottlings and most distinct on head. One or 2 dusky to blackish ocellated saddles on caudal peduncle above. Caudal with 2 dusky oblique subterminal bars which converge behind or form a lunate band.

Indian Ocean, Mascarene Islands, India, East Indies, China, Melanesia, Polynesia.

5683, 7680. Agojo Point, Catanduanes Island, east Luzon. June 10, 1909.

Length 111 to 126 mm.

18933. Batan Island, east Luzon. June 5, 1909. Length 111 mm.

15450. Bolinao Bay, west Luzon. May 10, 1909. Length 125 mm.

9031. Bongao Anchorage, Sulu Archipelago, Tawi Tawi Group. February 24, 1908. Length 123 mm.

10782. Dalaganem Island, eastern Palawan. April 8, 1909. Length 125 mm.

22041, 22042. Magnaas, Lagonoy Gulf, Luzon. June 17, 1909. Length 85 to 102 mm.

11377. Maricaban Island, Luzon. January 20, 1908. Length 129 mm.

11308, 15241 to 15245, 15247. Near Palag Bay, southern Luzon. June 16, 1909. Length 77 to 126 mm.

21562. Pilas Island, south of Zamboanga. September 12, 1909. Length 63 mm.

11023. Port Maricaban, southern Luzon. July 21, 1908. Length 154 mm.
 5062, 5063. Port Matalvi, western Luzon. November 23, 1908. Length 115 to 138 mm.
 4613, 14257, 14613. Port Palapag, east Luzon. June 3, 1909. Length 90 to 120 mm.
 24179. Rapurapu Island, east Luzon. June 22, 1909. Length 102 mm.
 16879. Sablayan, Mindoro. December 12, 1908. Length 126 mm.
 6420. Sulade Island, vicinity of Jolo. September 17, 1909. Length 120 mm.
 19005, 19232, 19233, 22265. Tapiantana Island, south of Zamboanga. September 13, 1909. Length 107 to 143 mm.
 21434. Tara Island, Panpan point, between Jolo and Tawi Tawi. September 20, 1909. Length 94 mm.
 8694. Tutu Bay, Jolo Island. September 19, 1909. Length 147 mm.
 21333. Birabirahan Island, off Borneo. December 31, 1909. Length 67 mm.
 15864. Danawan and Si Amil Islands, vicinity of Darvel Bay, Borneo. September 26, 1909. Length 111 mm.
 16426, 16428, 20468. Danawan and Si Amil Islands. September 27, 1909. Length 115 to 135 mm.
 14494. Tomahu Island, vicinity of Bouro. December 12, 1909. Length 100 mm.
 13453. Basa Island, Gulf of Boni, Celebes. December 17, 1909. Length 128 mm.
 13427, 22226, 22227. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 80 to 117 mm.
 16230. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 104 mm.
 13644. Una Una Road, Binang Unang Island, Celebes. November 18, 1909. Length 115 mm.
 18331, 18333 to 18336, 18338. West of Malibagu Point, Celebes. November 21, 1909. Length 91 to 129 mm. (SK. 2061).
 9703, 22855. Talisse Island, north of Celebes. November 9, 1909. Length 107 to 118 mm.
 21491. Gane Road, Gillolo Island. December 1, 1909. Length 112 mm.
 Three examples. Maitara Island. November 26, 1909. Length 60 to 62 mm.
 13219. Dowarra Island, Patiente Strait. December 2, 1909. Length 111 mm.
 19788. Gomomo Island, Pitt Passage. December 3, 1909. Length 95 mm.
 13545. Makyan Island. November 29, 1909. Length 118 mm.
 21548. Tidore Island, south of Ternate. November 25, 1909. Length 100 mm.
 22309. Tidore Island. November 29, 1909. Length 68 mm.
 Two examples. Tomahu Island. December 12, 1909. Length 38 to 45 mm.

The following represent the var. *zanana*:

9956. Doe Can Island, Sulu Sea. January 7, 1910. Length 125 mm.
 19006, 19007, 21902. Tapiantana Island, south of Zamboanga. September 13, 1909. Length 125 to 132 mm.
 6654, 6655, 7924. Tutu Bay, Jolo Island, first anchorage. September 19, 1909. Length 160 to 183 mm.
 6906, 6907. Danawan and Si Amil Islands, vicinity Darvel Bay, Borneo. September 26, 1909. Length 151 to 165 mm.
 17576. Danawan and Si Amil Islands. September 27, 1909. Length 140 mm.
 8944. Mabul Island, off Borneo. September 29, 1909. Length 114 mm.
 9689. Uki, Bouro Island. December 9, 1909. Length 195 mm.
 Two examples. Tomahu Island. December 12, 1909. Length 36 to 44 mm.
 12922, 13425, 13426, 13428, 22225. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 70 to 148 mm.
 18339. West Malibagu Point, Celebes. November 21, 1909. Length 155 mm.

8712. Una Una Road, Binang Unang Island, Gulf of Tomini, Celebes. November 17, 1909. Length 152 mm.
- 13220 to 13222, 21477, 21479. Dowarra Island. December 2, 1909. Length 65 to 169 mm.
9985. Maitara Island. November 26, 1909. Length 107 mm.
- 12470, 13122, 13837. Powati Harbor, Makyan Island. November 28, 1909. Length 89 to 145 mm.
- Three examples. Kayoa Island, between Gillolo and Kayoa Islands. November 29, 1909. Length 51 to 80 mm.

CEPHALOPHOLIS PACHYCENTRON (Valenciennes)

- Serranus pachycentron* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 295. East Indies.
- Serranus pachycentrum* MACLEAY, Proc. Linn. Soc. New South Wales, vol. 5, 1880, p. 314 (Port Darwin, Queensland).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 9 (North Celebes).
- Epinephelus pachycentrum* BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 178 (type, Ceylon, Madras, Singapore, Malay Archipelago, Louisiades).—BEAUFORT, Bijl. Dierk., Amsterdam, 1913, p. 111 (Saonek, Waigiu; Amboina).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 199 (Saleyer).
- Petrometopon pachycentron* FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 521 (Padang, Sumatra); Mem. Bishop Mus., vol. 10, 1928, p. 173 (Shortland and Palmyra Islands).
- Cephalopholis pachycentron* EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 76 (Bacon).
- Serranus guttatus* (not BLOCH) VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 359 (specimen from Waigiu).
- Serranus zananello* (not VALENCIENNES) BLEEKER, Verh. Batav. Genootsch. (Percoid.), vol. 22, 1849, p. 32 (Batavia, Java).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 116 (copied).—GORGOKA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 282 (Mindoro).
- Serranus microprion* BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 552. Amboyna.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 116 (Louisiades).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 460 (Samar, Villa real, Panay).
- Epinephelus microprion* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 39, pl. (2) 280, fig. 1 (Sumatra, Batu, Nias, Java, Bawean, Celebes, Halmahera, Batjan, Ternate, Buru, Timor, Ceram, Amboina, New Guinea).
- Epinephelus boelang* (not VALENCIENNES) BLEEKER, Atlas Ichth. Ind. Néerland., vol. 8, 1876-77, pl. (68) 346, fig. 5.

Depth $2\frac{2}{3}$ to $2\frac{1}{2}$; head $2\frac{1}{4}$ to $2\frac{3}{5}$, width $2\frac{2}{3}$ to $2\frac{3}{5}$. Snout $4\frac{1}{5}$ to $4\frac{1}{4}$ in head from snout tip; eye 5 to $6\frac{2}{5}$, $1\frac{2}{5}$ in snout to greater than snout in young, $1\frac{1}{8}$ in interorbital; maxillary reaches opposite hind eye edge or little beyond, expansion $\frac{2}{3}$ to 1 in eye, length 2 to $2\frac{1}{5}$ in head from snout tip; teeth fine, in bands in jaws, outer series scarcely larger; pair of front canines in each jaw, minute teeth on vomer and palatines; interorbital $6\frac{1}{4}$ to $7\frac{3}{5}$, slightly convex; hind preopercle edge finely serrated; median opercle spine closer to lower, which most advanced. Gill rakers 7+14, equal gill filaments or nearly $\frac{2}{5}$ of eye; 1 to 5 above and as many below rudimentary.

Scales 80 to 88 in lateral line to caudal base, and 15 to 17 more on latter; tubes 43 to 48 in lateral line to caudal base and 3 to 5 more on latter; 15 to 17 scales above lateral line, 29 or 30 below, about 45 predorsal, 22 rows on cheek; scales on head mostly smooth; fins with small basal scales; maxillary naked. Scales with 6 to 9 basal radiating striae; 28 to 35 apical denticles with 3 or 4 transverse series; circuli fine.

D. IX, 16, I, or 15, I, third spine $2\frac{7}{8}$ to $3\frac{1}{5}$ in total head length, eighth ray $2\frac{1}{8}$ to $2\frac{1}{5}$; A. III, 8, I, second spine $2\frac{1}{2}$, fifth ray 2 to $2\frac{1}{6}$; caudal $1\frac{3}{4}$ to $1\frac{4}{5}$, rounded convexly behind; least depth of caudal peduncle 3 to $3\frac{1}{4}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{7}{8}$ to 2.

Chocolate brown, with eight poorly defined darker vertical cross bands. Head and body anteriorly usually finely spotted with small blue dots each with dark ring marginally, much larger and fewer in

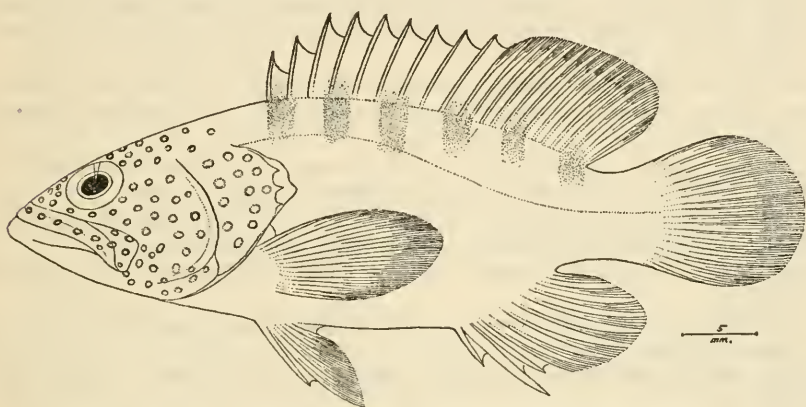


Figure 9.—*CEPHALOPHOLIS PACHYCENTRON* (VALENCIENNES), YOUNG

young. Lower body surface little paler than back. Eye pale brown. Fins blackish brown, vertical with submarginal blackish bands. Upper dorsal edges and corners or upper and lower caudal edges narrowly white.

India, Ceylon, East Indies, Philippines, Queensland, Melanesia.

5188, 5189. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 115 to 133 mm.

16013, 14884, 17707. Alimango Bay, Burias Island. March 5, 1909. Length 131 to 168 mm.

10586. Bolalo Bay, Palawan. December 21, 1909. Length 112 mm.

15451. Bolinao Bay, west Luzon. May 10, 1909. Length 124 mm.

8865. Buang Bay, Talajit Island, between Samar and Masbate. March 15, 1909. Length 172 mm.

8056, 8057, 21269. Busin Harbor, Burias Island. April 22, 1909. Length 140 to 155 mm.

16672, 22775. Busin Harbor. April 23, 1908. Length 121 to 137 mm.

16783. Busin Harbor, Burias Island. March 7, 1909. Length 142 mm.

15315. Busin Harbor, Burias Island. March 8, 1909. Length 101 mm.
- 11066, 15500, 17179, 18725. Butauanan Island, east coast Luzon. June 13, 1909. Length 93 to 127 mm.
17417. Candaraman Island, north Balabac Strait. January 4, 1909. Length 100 mm.
22258. Canimo Island, near Dact, east coast Luzon. June 15, 1909. Length 112 mm.
- 15051, 17075, 17480. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 96 to 136 mm. (1315). Pale olive green, head numerously spotted with blue specks which extend to breast even with pectoral bases and about same distance on nuchal region, those above much smaller. Fins without white margins, soft portions almost black.
- 8716, 12729, 12730, 15076. Capulaan Bay, Pagbilao, Chica Island, vicinity Marinduque. February 24, 1909. Length 81 to 144 mm.
11844. Caracaran, Batan Island, east coast Luzon. June 8, 1909. Length 115 mm.
- 6926, 6928. Catbalogan, Samar. April 16, 1908. Length 123 to 140 mm.
19835. Endeavor Strait, Palawan Island. December 22, 1908. Length 115 mm.
- 10929, 10930, 12688, 12689, 21534. Endeavor Strait. December 23, 1908. Length 115 to 138 mm.
- 14102, 14103. Endeavor Strait. December 24, 1908. Length 132 to 135 mm.
7387. Gigoso Point, Quinapundan Bay, Samar Island. July 28, 1909. Length 122 mm.
9443. Ligpo Point, Balayan Bay, Luzon. January 18, 1908. Length 131 mm.
19823. Mactan Island, Cebu. March 25, 1909. Length 112 mm.
14550. Maculabo Island, east coast Luzon. June 14, 1909. Length 101 mm.
19666. Makesi Island, Palawan. April 5, 1909. Length 100 mm.
- 6197, 20023. Malapascua Island, north of Cebu. March 16, 1909. Length 151 mm.
- 12017, 12524. Malcochin Harbor, Linapacan Island. December 19, 1908. Length 138 to 151 mm.
- 12352, 16395, 16396, 21135. Mansalay, Mindoro. June 4, 1908. Length 50 to 115 mm.
16618. Maribojoc Bay, Bohol Island. March 26, 1909. Length 132 mm.
16495. Masamat Bay, Quinalasag Island. June 12, 1909. Length 65 mm.
- 9047, 12283, 15955. Masbate Reef, Masbate. April 20, 1908. Length 128 to 143 mm.
- 17447, 17630. Mompog Island, Anabayas Islands. March 3, 1909. Length 135 to 150 mm.
- 7488, 17216, 17456. Murcielagos Bay, Mindanao. August 9, 1909. Length 130 to 154 mm.
5794. Nabatas Point, Samar Island. July 24, 1909. Length 109 mm.
- 15246, 15248, 15249, 15250. Near Palag Bay, Luzon. June 16, 1909. Length 102 to 121 mm.
19027. Northwest Verde Island. July 22, 1908. Length 127 mm.
- 9190, 20565, 20639, 20640. Opol, Mindanao Island. August 4, 1909. Length 101 to 155 mm.
- Eight examples. Oyster Inlet, Ulugan Bay, Palawan Island. December 28, 1908. Length 61 to 139 mm.
13115. Paron Point, Albay Gulf, Luzon. June 21, 1909. Length 120 mm.
21604. Pasacao, Ragay Gulf, Luzon. March 9, 1909. Length 133 mm.
10534. Polloc, Mindanao. May 22, 1908. Length 120 mm.
11751. Port Banalacan, Marinduque Island. February 23, 1909. Length 130 mm.

12959. Port Jamelo, Luzon. July 13, 1908. Length 122 mm.
 10309, 10332. Port Maricaban, southern Luzon. July 21, 1908. Length 121 to 155 mm.
 16521, 16522, 16533, 16534, 18350, 18351. Port Matalvi, Luzon. November 22, 1908. Length 115 to 136 mm.
 5060, 5061. Port Matalvi. November 23, 1908. Length 128 to 136 mm.
 12654. Port Palapag, east coast Luzon. June 3, 1909. Length 133 mm.
 9530, 11579 to 11581, 12113. Port Uson west of Pinas Island. December 17, 1908. Length 90 to 136 mm.
 5706, 14170, 20769, 21005. Pujada Bay, Mindanao. May 10-15, 1908. Length 113 to 153 mm.
 18972, 21355. Quinalasag Island, Masamat Bay, east coast Luzon. June 12, 1909. Length 116 to 120 mm.
 13275, 13406 to 13408. Rapurapu Island, east coast Luzon. June 22, 1909. Length 92 to 140 mm. 11 examples.
 6401. Rasa Island, Mantaquin Bay, vicinity eastern Palawan. April 1, 1909. Length 123 mm.
 17486. Refugio Island, Pasacao, Luzon. March 9, 1909. Length 123 mm.
 19922, 19923. Romblon Harbor, Romblon. March 25, 1908. Length 100 to 121 mm. (450; 451).
 11892, 18157, 18158. San Miguel Harbor, Ticao Island. April 21, 1908. Length 110 to 127 mm.
 12681. San Miguel Island, Tabaco Bay, east coast Luzon. June 4, 1909. Length 123 mm.
 12212, 20972, 20973. Santa Cruz Island, Marinduque. April 24, 1908. Length 111 to 120 mm.
 16691. Surigao, east coast Mindanao. May 8, 1908. Length 85 mm.
 14216, 14217. Taganak Island, Jolo Sea. January 7, 1909. Length 131 to 132 mm.
 18204. Tara Island, Mindoro Strait. December 14, 1908. Length 147 mm.
 9521, 9522. Tara Island. December 15, 1908. Length 137 to 148 mm.
 7944. Tataan, Tawi Tawi Group. February 20, 1908. Length 155 mm. (197).
 10450. Tilig, Lubang Island, vicinity southern Luzon. July 14, 1908. Length 106 mm.
 10885, 10886, 15529. Tilig. July 15, 1908. Length 88 to 142 mm.
 14515. Ulagan Bay, Rita Island, Palawan. December 29, 1908. Length 115 mm.
 9148, 9149. Varadero Bay, Mindoro. July 23, 1908. Length 168 to 171 mm.
 17858, 17859. Bumbum Island, vicinity Darvel Bay, Borneo. September 25, 1909. Length 125 to 130 mm.
 7214. Limbe Strait, Celebes. November 9, 1909. Length 131 mm.
 12792. Limbe Strait, Celebes. November 10, 1909. Length 110 mm.
 21490. Gane Road, Gillolo Island. December 1, 1909. Length 168 mm.
 19787. Gomomo Island, Pitt passage. December 3, 1909. Length 115 mm.

CEPHALOPHOLIS CYANOSTIGMA (Valenciennes)

Serranus cyanostigma (KÜHL and VAN HASSELT) VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 359. Java.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 117 (copied).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 460 (Paragua).

Epinephelus cyanostigma BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 42 (Sumatra, Java, Denizend Islands, Celebes, Flores, Batjan, Amboina); vol. 8, 1876-77, p. 152 (note on figure).—BOULENGER, Cat.

Fish. Brit. Mus., vol. 1, 1895, p. 181 (Amboyna).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 199 (Saleyer).

Petrometopon cyanostigma FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 521 (Padang, Sumatra).

Epinephelus argus (not SCHNEIDER) BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (42) 320, fig. 3.

Depth $2\frac{1}{5}$ to 3; head $2\frac{1}{3}$ to $2\frac{1}{2}$, width $2\frac{1}{3}$ to $2\frac{3}{5}$. Snout 4 to $4\frac{1}{5}$ in head from snout tip; eye $4\frac{3}{4}$ to 7, $1\frac{1}{8}$ to $1\frac{7}{8}$ in snout, greater than interorbital in young to $1\frac{1}{5}$ with age; maxillary reaches beyond eye, expansion $1\frac{1}{3}$ in eye in young to little greater than eye diameter in adult, length $1\frac{7}{8}$ to $2\frac{1}{10}$ in head from snout tip; teeth fine, conic, in bands in jaws; wide set pair of canines above, often double; outer maxillary row of teeth slightly enlarged and inner front teeth longest and hinged; mandibular teeth with inner row longest, hinged, resolving into 3 rows on sides of jaws, front canines small and often double; bands of small teeth on vomer and palatines, none on tongue; nostrils subequal or hind one but little larger; interorbital $6\frac{1}{3}$ to $7\frac{1}{2}$, slightly convex; hind preopercle edge minutely serrated, serrae often obsolete with age; opercular spines 3, lower most advanced and closer to median. Gill rakers 12 + 20, lanceolate, longer than gill filaments or $1\frac{1}{3}$ in eye; 10 above and below rudimentary.

Scales 85 to 97 in lateral line to caudal base and 13 to 15 more on latter; tubes 45 to 56 in lateral line to caudal base and 4 to 8 more on latter; 21 to 23 scales above lateral line, 25 to 31 below, 70 to 73 predorsal, 30 to 35 rows across cheek to preopercle angle; upper half of maxillary expansion scaly, with 13 transverse series of small scales; body scales without auxiliary small basal scales; fins all covered basally with small scales, especially soft vertical fins. Scales with 6 to 9 basal radiating striae; 28 to 30 apical denticles with 3 or 4 transverse series of basal elements; circuli moderately small.

D. IX, 16, I, or 15, I, third spine $3\frac{1}{5}$ to $3\frac{3}{5}$ in total head length, twelfth ray $2\frac{1}{8}$ to $2\frac{2}{5}$; A. III, 8, I or 9, I, second spine $2\frac{3}{5}$ to $3\frac{1}{8}$, sixth ray 2 to $2\frac{1}{5}$; caudal $1\frac{2}{3}$ to $1\frac{3}{4}$, convexly rounded behind; least depth of caudal peduncle $2\frac{3}{5}$ to $3\frac{1}{5}$; pectoral $1\frac{1}{2}$ to $1\frac{3}{5}$; ventral $1\frac{3}{4}$ to 2.

In alcohol dark brown generally, with small dusky brown to blackish ocellated rings, center of each blue gray dot or very small spot, with age larger, more sparse and more distinct or contrasted on breast and belly. In many alcoholic examples dark rings fade and leave only gray spots. These spots extend over all fins as well, except on pectoral they do not reach quite its margin or outer half of fin yellowish and its edge narrowly blackish. Iris brown. Body with 6 dark underlaid or obscure transverse reticulated dark bands, wide as interspaces and most distinct in young.

Known only from the East Indies, Bleeker having 13 examples 160 to 350 mm. long, though our largest much smaller.

6722. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 215 mm.
 11294. Alimango Bay, Burias Island. March 5, 1909. Length 185 mm.
 18930, 18931. Batan Island, east coast Luzon. June 5, 1909. Length 149 to 198 mm.
 8671. Biri Channel, east coast Luzon. June 2, 1909. Length 260 mm.
 7476, 7477. Bolalo Bay, Palawan Island. December 21, 1908. Length 220 to 246 mm.
 8116. Burias Island. March 5, 1909. Length 235 mm.
 8347. Buang Bay, Talajit Island. March 15, 1909. Length 275 mm.
 11065, 11067, 14538, 14539, 18727, 22286. Butauanan Island, east coast of Luzon. June 13, 1909. Length 122 to 193 mm.
 7785. Candaraman Island, north Balabac Strait. January 4, 1909. Length 239 mm.
 16657. Canimo Island, near Dact. June 15, 1909. Length 189 mm.
 8282. Canmahala Bay, Luzon. March 11, 1909. Length 242 mm.
 8030. Capulaan Bay, Pagbilao, Chica Island. February 24, 1909. Length 247 mm.
 11846. Caracaran, Batan Island. June 8, 1909. Length 162 mm.
 7735. Caxisigan Island, Balabac. January 2, 1909. Length 273 mm.
 5346. Cebu market, Cebu. April 4, 1908. Length 218 mm.
 6527. Cebu market. April 5, 1908. Length 190 mm.
 5429. Cebu market. April 7, 1908. Length 232 mm.
 6118. Iloilo market, Iloilo. June 2, 1908. Length 218 mm. (93). Top of head and back bister, shading to burnt umber on sides and breast. Head, body and fins thickly dotted with small azure blue spots. Iris bister, golden around pupil, body of eye with blue spots. Branchiostegals and membranes burnt umber. Inside mouth vermilion. Spinous dorsal tawney olive, notches of membranes with reddish tinge. Soft dorsal, caudal and anal bister. Pectoral bister, margin broadly coral red, with narrow black submarginal line. Ventral light brown.
 14347. Limbones Cove, Manila Bay. February 8, 1909. Length 125 mm.
 7422, 12523. Linapacan Island, Malcochin Harbor, Linapacan Strait. December 18, 1908. Length 179 to 272 mm.
 6041 to 6043. Little Santa Cruz Island. May 28, 1908. Length 222 to 252 mm.
 17754. Lubang Island. July 17, 1908. Length 221 mm.
 11357. Maagnas, Lagonoy Gulf, Luzon. January 17, 1909. Length 240 mm.
 7441, 7881, 14551, 14552, 16716. Maculabo Island, east coast Luzon. Length 90 to 171 mm.
 15791. Makesi Island, Palawan. April 5, 1909. Length 147 mm.
 6187, 12351. Mansalay, Mindoro. June 4, 1908. Length 165 to 213 mm. (96).
 4734. Maricaban Island, Luzon. January 20, 1908. Length 223 mm.
 11353. Mompog Island. March 3, 1909. Length 190 mm.
 17217 to 17220. Murcielagos Bay, Mindanao. August, 1909. Length 158 to 214 mm.
 5796. Nabatas Point, Samar Island. July 24, 1909. Length 175 mm.
 15675. Near Palag Bay, Luzon Island. June 16, 1909. Length 140 mm.
 9390, 19132. Paluan Bay, Mindoro. December 11, 1908. Length 174 to 235 mm.
 11124. Pasacao, Ragay Gulf, Luzon. March 9, 1909. Length 177 mm.
 6347, 9021, 9271. Port Jamelo, Luzon. July 13, 1908. Length 172 to 230 mm.
 17624. Port Langan, Palawan. April 8, 1909. Length 195 mm.
 6552, 6563, 6564. Port Maricaban, southern Luzon. July 21, 1908. Length 256 to 300 mm.
 7282. Port Matalvi, Luzon. November 23, 1908. Length 235 mm.

5546. Rasa Island, eastern Palawan. April 1, 1909. Length 163 mm.
 11893. San Miguel Harbor, Ticao. April 21, 1908. Length 95 mm. (85).
 21878. Singaan Island, between Jolo and Tawi Tawi. September 21, 1909. Length 107 mm.
 7344. Tara Island, Mindoro Strait. December 14, 1908. Length 213 mm.
 6841. Tataan, Simulac Island. February 19, 1908. Length 190 mm. (150).
 10398, 10449, 18753. Tilig, Lubang Island. July 14, 1908. Length 125 to 168 mm.
 7663. Ulugan Bay, Palawan. December 28, 1908. Length 242 mm.
 7693, 14516. Ulugan Bay. December 29, 1908. Length 146 to 256 mm.
 6633. Varadero Bay, Mindoro. July 23, 1908. Length 256 mm.
 7148, 7149. West coast Palaui Island. November 18, 1908. Length 256 to 260 mm.
 16429. Danawan Island, vicinity Darvel Bay, Borneo. September 27, 1909. Length 137 mm.
 13424. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 123 mm. (2059).
 A858. Limbe Strait, Celebes. November 9, 1909. Length 260 mm.
 22860. Togian Island, Celebes. November 19, 1909. Length 146 mm.
 A1133. Kayoa Island. November 29, 1909. Length 254 mm.

CEPHALOPHOLIS ARGUS Schneider

- Cephalopholis argus* SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 311, pl. 61. East Indies.—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 258 (Pago Pago, Samoa).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 252 (Thornton Island; Samoa).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 256 (Cagayancillo).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 33 (Samoa).—FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925, p. 14 (Wake Island).—FOWLER, Bishop Mus. Bull., No. 38, 1927, p. 13 (Palmyra, Jarvis and Tongareva Islands); Mem. Bishop Mus., vol. 10, 1928, p. 174, pl. 14, fig. C (Mangareva, Shortland Island, Tubuai, Tahiti, Nukuhiva, Rarotonga, Palmyra, Wake Island, Tahiti, Fanning Islands, Jaluit, Funafuti, Taritari, Rangiroa, Apia, Apiang, Society Islands, Ascension Island, Ebon Island, Ponapé, Thornton Island).
Serranus argus CUVIER, Hist. Nat. Poiss., vol. 2, 1827, p. 360 (on drawings by VLAMING).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 115 (East Indies).—PETERS, Monatsb. Akad. Wiss. Berlin, 1865, p. 113 (type).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 8 (north Celebes).
Serranus guttatus var. *argus* GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 5, pl. 4, figs. A-B.
Epinephelus argus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 43 (Sumatra, Batu, Nias, Singapore, Java, Borneo, Celebes, Sangir, Timor, Ternate, Buru, Ceram, Amboina, Goram, New Guinea); vol. 8, 1876-77, pl. (64) 342, fig. 3.—JATZOW and LENZ, Abh. Senckenberg. Naturf. Ges., vol. 21, 1889, p. 498 (Zanzibar).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 54.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 189 (Zanzibar, Seychelles, Mauritius, Ceylon, Andamans, Borneo, Ceram, Duke of York Island, Savay, Samoa).—REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, 1905, p. 329 (Persian Gulf); Journ. Linn. Soc. London, vol. 12, ser. 2, 1907, p. 222 (Maldives).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 200 (Makassar).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 473 (Mozambique coast).

Bodianus guttatus (preoccupied by *Perca guttata* LINNAEUS) BLOCH, *Naturg. Ausländ. Fische*, vol. 4, 1790, p. 36 (East or West Indies, Africa, St. Helena Island, Jamaica; part).

Bodianus guttatus BLOCH, *Naturg. Ausländ. Fische*, vol. 4, 1790, pl. 224.—WALBAUM, *Artedi Pisc.*, vol. 3, 1792, p. 674 (on BLOCH).—FORSTER, *Fauna Indica*, 1795, p. 16.—SCHNEIDER, *Syst. Ichth. Bloch*, 1801, p. 330 (Japan).

Serranus guttatus PETERS, *Arch. Naturg.* 1855, p. 235 (Mozambique).—GÜNTHER, *Cat. Fish. Brit. Mus.*, vol. 1, 1859, p. 119 (Mauritius, Ceylon, Borneo).—KNER, *Reise Novara, Zool.*, vol. 1, pt. 5, 1865, p. 22 (Tahiti).—KLUNZINGER, *Verh. zool. bot. Ges. Wien*, vol. 20, 1870, p. 686 (Red Sea).—GÜNTHER, *Journ. Mus. Godeffroy*, vol. 1, pt. 1, 1873, p. 5, pl. 4 (Red Sea, East Africa, North Australia, Polynesia).—DAY, *Fishes of India*, pt. 1, 1875, p. 24, pl. 6, fig. 3.—MACLEAY, *Proc. Linn. Soc. New South Wales*, vol. 5, 1880, p. 315 (north coast of Australia).—KLUNZINGER, *Fische Roth. Meer.*, 1884, p. 3.—DAY, *Fauna Brit. India*, vol. 1, 1889, p. 457.

Perca miniata (part) FORSKÅL, *Descript. Animal.*, 1775, p. 41.

Bodianus jacob-evertsen (part) LACÉPÈDE, *Hist. Nat. Poiss.*, vol. 4, 1802, p. 296.

Serranus luti (not FORSKÅL) CUVIER, *Hist. Nat. Poiss.*, vol. 2, 1828, p. 363.

Serranus myriaster CUVIER, *Hist. Nat. Poiss.*, vol. 2, 1828, p. 365. Borabora, Society Islands, and Hawaiian Islands.—RÜPPELL, *Atlas Reise nördl. Afrika, Fische*, 1828, p. 107, pl. 27, fig. 1 (Red Sea).—LESSON, *Voy. Coquille, Zool.*, vol. 2, pt. 1, 1830, p. 234, pl. 37 (Borabora).—QUOY and GAIMARD, *Voy. Astrolabe, Zool.*, vol. 3, 1834, p. 653, pl. 3, fig. 1 (New Guinea).—RÜPPELL, *Neue Wirbelth., Fische*, 1835, p. 102 (reference only).—RICHARDSON, *Ichth. China, Japan*, 1845, p. 233 (China).—GUICHENOT, *Notes Ile Réunion*, vol. 2, 1862, p. 23.

Cromileptes myriaster SWANSON, *Nat. Hist. Animals*, vol. 2, 1839, p. 201 (on RÜPPELL, pl. 27, fig. 1).

Serranus immunerur THIOLLIÈRE, *Fauna Woodlark*, 1857, p. 144. Woodlark Island.

Serranus perguttatus DE VIS, *Proc. Linn. Soc. New South Wales*, vol. 8, 1883, p. 445. New Hebrides.

Serranus thyrsites KENT, *Great Barrier Reef*, 1893, p. 369 (Queensland).

Cephalopholis kendalli EVERMANN and SEALE, *Bull. Bur. Fisher.*, vol. 26, 1906 (1907), p. 76, fig. 11. Bacon.

Depth $2\frac{5}{8}$ to $3\frac{1}{2}$; head $2\frac{1}{3}$ to $2\frac{3}{5}$, width $2\frac{1}{4}$ to $2\frac{1}{2}$. Snout $3\frac{1}{2}$ to $4\frac{1}{2}$ in head from snout tip; eye 5 to $8\frac{1}{3}$, $1\frac{1}{10}$ to 2 in snout, greater than interorbital to $1\frac{1}{4}$ with age; maxillary reaches little beyond eye or $1\frac{1}{3}$ eye diameters with age, expansion $1\frac{1}{4}$ in eye to greater than eye diameter with age, length $1\frac{7}{8}$ to 2 in head from snout tip; broad bands of fine teeth in jaws, inner upper and lower enlarged and depressible; 6 rows of teeth in front of mandible, narrowing posteriorly; pair of front canines in each jaw; bands of small teeth on vomer and palatines; interorbital $6\frac{1}{5}$ to 8 , but slightly convex; preopercle edge nearly entire or serrae obsolete, opercular spines 3, median most posterior and little nearer upper than lower. Gill rakers 9 to 11 + 17, lanceolate, little less than gill filaments or $\frac{1}{2}$ of eye; 8 to 10 upper and 10 lower rudimentary.

Scales 93 to 103 in lateral line to caudal base and 10 to 12 more on latter; tubes 40 to 50 in lateral line to caudal base and 4 to 6 more on latter; 12 to 16 scales above, 22 to 32 below; 34 to 36 rows across cheek; scales rather smooth on head and body scales with many small auxiliary basal scales; fins all more or less finely scaled basally; maxillary expansion finely scaled, less so in young. Scales with 6 or 7 basal radiating striae; apical denticles 35 to 54, with 5 or 6 transverse series; circuli fine.

D. IX, 16, I, fourth spine $2\frac{7}{8}$ to $4\frac{1}{4}$ in total head length, twelfth ray $2\frac{1}{2}$ to $2\frac{5}{8}$; A. III, 9, I, second spine $2\frac{1}{3}$ to $4\frac{1}{2}$, fifth ray $2\frac{1}{8}$ to $2\frac{2}{5}$; caudal $1\frac{2}{3}$ to $1\frac{7}{8}$, rounded; least depth of caudal peduncle $2\frac{7}{8}$ to $3\frac{1}{3}$; pectoral $1\frac{1}{2}$ to $1\frac{3}{4}$; ventral $1\frac{7}{8}$ to $2\frac{1}{4}$.

Deep dusky or blackish brown, more or less uniform and fins all blackish. Body with 9 or 10 obscurely defined darker vertical bands. Body and fins everywhere dotted with grayish dusky edged ocelli, more or less uniform in size. Iris blackish. Tip of each membrane of spinous dorsal yellowish with age. Edges of rayed vertical fins and pectorals narrowly pale brown.

Red Sea, Zanzibar, Mozambique, Mauritius, Reunion, Madagascar, Seychelles, Persian Gulf, Maldives, India, Ceylon, Andamans, East Indies, Philippines, China, North Australia, Queensland, Melanesia, Polynesia, Hawaii. Abundant and reaches 430 mm. in length. *Cephalopholis kendalli* is evidently only a color variety of this species. Schneider's figure of *C. argus* is crude and shows quite large spots, though not indicated on the head. Our examples show but faint traces of the dark vertical bars on the trunk, though in similar arrangement with Schneider's figure. This also shows no pale edges to the rayed vertical fins and the pectoral. Boulenger gives the maximum size as 430 mm. though we have none so large.

5684. Agojo Point, Catanduanes Island, east coast of Luzon. June 10, 1909.

Length 167 mm.

8135, 8136. Alibijaban Bay, Ragay Gulf, Luzon. March 6, 1909. Length 302 to 307 mm.

9196, 9197. Cagiguin Island, between Leyte and Mindanao. August 3, 1909.

Length 258 to 298 mm.

22257. Canimo Island, near Daet, east coast Luzon. June 15, 1909. Length 97 mm.

9260. Inamucan Bay, Mindanao. August 8, 1909. Length 302 mm.

6039, 6044. Little Santa Cruz Island. May 28, 1908. Length 247 to 375 mm. (100).

7234. Masinloc Bay, Zambales, off west Luzon. November 22, 1908. Length 222 mm.

7284. Paluan Bay, Mindoro. December 11, 1908. Length 315 mm.

One example. Philippines. Length 250 mm.

21563, 21564. Pilas Island, south of Zamboanga. September 12, 1909. Length 122 to 134 mm.

20677. Port Banalacan, Marinduque. February 23, 1909. Length 90 mm.

- 6561, 6562. Port Maricaban, southern Luzon. July 21, 1908. Length 268 to 365 mm.
19628. Port Palapag. June 3, 1909. Length 115 mm.
14781. Sablayan, Mindoro. December 12, 1908. Length 202 mm.
- 19072, 19100. Silino Island, northern Mindanao vicinity. August 10, 1909. Length 168 to 207 mm.
- A510. Tapiantana Island. September 13, 1909. Length 260 mm.
12383. Tataan Island, Tawi Tawi Group. February 21, 1908. Length 217 mm. (271).
- 41, 19188. Tulnalutan Island, east of Zamboanga. September 9, 1909. Length 22 to 188 mm.
16589. Tulnalutan Island. September 9, 1909. Length 158 mm.
7658. Usada Island, near Jolo. March 5, 1908. Length 149 mm. (378).
- 7150, 7151. West coast of Palaui Island, off northern Luzon. November 18, 1908. Length 285 to 337 mm.
5933. Zamboanga market. May 25, 1908. Length 301 mm. (93).
8920. Mabul Island, Sibuko Bay vicinity, Borneo. September 29, 1909. Length 298 mm.
- A986. Binang Unang Island, Gulf of Totomi, Celebes. November 18, 1909. Length 239 mm.

CEPHALOPHOLIS SEXMACULATUS (Rüppell)

Serranus sexmaculatus RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 107. Red Sea.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 118 (copied); Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 3, pl. 2 (Red Sea, Indian Ocean, Society Islands, Tuamotus).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 680 (Koseir, Red Sea); Fische Roth. Meer., 1884, p. 4.

Epinephelus sexmaculatus BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 194 (Red Sea, Zanzibar, Mauritius, Tahiti).

Cephalopholis sexmaculatus FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 175 (Society Islands).

Depth $2\frac{2}{3}$ to $2\frac{4}{5}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{5}$ to $2\frac{1}{2}$. Snout $3\frac{4}{5}$ to $3\frac{7}{8}$ in head from snout tip; eye 6 to $6\frac{1}{2}$, $1\frac{1}{2}$ to $1\frac{2}{3}$ in snout, greater than interorbital; maxillary reaches little beyond eye, expansion 1 to $1\frac{1}{2}$, length 2 in head from snout tip; teeth form rather wide bands in jaws, in mandible 4 rows anteriorly narrowing to 2 rows posteriorly; pair of canines in front of each jaw, often double; narrow band of fine teeth on vomer and on each palatine; interorbital 6 to $9\frac{1}{3}$; hind preopercle edge with very minute, feeble or obsolete denticles; median opercular spine little nearer lower, which most advanced. Gill rakers 7 + 16, lanceolate, greatly longer than gill filaments or $\frac{1}{2}$ of eye; 5 above and 5 below rudimentary.

Scales 90 to 92 in lateral line to caudal base and 10 to 12 more on latter; tubes 47 or 48 in lateral line to caudal base and 3 or 4 more on latter; 14 or 15 scales above, 28 to 30 below, 84 to 90 predorsal, 30 to 34 rows across cheek; fins all finely scaled basally; body scales without auxiliary small basal scales; maxillary scales on expansion in about 17 transverse rows. Scales with 8 basal radiating striae; 43 to 45 apical denticles in 4 or 5 transverse series; circuli fine.

D. IX, 15, 1, fourth spine $3\frac{1}{5}$ to $3\frac{1}{2}$ in total head length, first branched ray $2\frac{1}{5}$ to $3\frac{1}{4}$; A. III, 9, 1, third spine $3\frac{1}{5}$ to $3\frac{1}{4}$, fourth ray $2\frac{1}{5}$ to $2\frac{1}{4}$; caudal $1\frac{3}{4}$ to $1\frac{1}{2}$, convex behind; least depth of caudal peduncle 3 to $3\frac{2}{5}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{7}{8}$ to 2.

Pale brown generally with traces of fine pale dots or small spots over all of head and body. Head rather sparsely spotted with deeper brown. On back along bases of dorsals, 4 deep brown blotches, each wider than interspaces and 2 narrower ones as saddles over upper surface of caudal peduncle. Fins all pale like body, with traces of blue spots.

Red Sea, Zanzibar, Mauritius, Indian Ocean, Polynesia, East Indies, Philippines. According to Boulenger reaches 375 mm.

5995. Zamboanga market. May 26, 1908. Length 310 mm.

A1070. Ternate market, Ternate, Dutch East Indies. November 26, 1909. Length 290 mm.

CEPHALOPHOLIS BOENACK (Bloch)

Bodianus boenack BLOCH, Naturg. Ausländ. Fische, vol. 4, 1790, p. 43. Japan.—WALBAUM, Artedi Pisc., vol. 3, 1792, p. 676 (on BLOCH).—FORS-TER, Fauna Indica, 1795, p. 6.—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 330.

Bodianus boenack BLOCH, Naturg. Ausländ. Fische, vol. 4, 1790, pl. 226.

Serranus boenack VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1830, p. 362 (Japan; Moluccas).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 112 (Amboyna).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 21 (Singapore; Java).—DAY, Fishes of India, pt. 1, 1875, p. 23, pl. 6, fig. 1 (Waltair; Mauritius); Fauna Brit. India, vol. 1, 1889, p. 455.—THURSTON, Notes Pearl Fisheries Manaar, 1890, p. 91 (Tuticorin).

Serranus boenack PETERS, Monatsb. Akad. Wiss. Berlin, 1865, p. 105 (type).

Epinephelus boenack BLEEKER, Nederland. Tijds. Dierk., vol. 2, 1865, p. 277 (Amboina); Verslag. Meded. Akad. Wet. Amsterdam, ser. 2, vol. 2, 1868, p. 338 (Reunion).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 180 (Zanzibar, Madras, Vizagapatam, China, Shanghai, Formosa, Malay Archipelago, Java, Amboina), p. 371 (Pulo Satang, Sarawak).—PELLEGRIN, Bull. Soc. Zool. France, vol. 30, 1905, p. 85 (Tonkin).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 71, pt. 1, 1907, p. 125 (Gischin, southern Arabia).

Epinephelus boenack WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 199 (Makassar).

Cephalopholis boenack EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 77 (Bacon).—SEALE, Philippine Journ. Sci., vol. 9, 1914, p. 65 (Hong Kong).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 173 (compiled).

Perca fusca THUNBERG, Vet. Akad. Handl., vol. 14, 1793, p. 297, pl. 9, fig. (lower).

Sciaena formosa SHAW and NODDER, Nat. Miscell., vol. 23, 1789–1813, pl. 1007 (on *Rahtee bontoo* RUSSELL, Fishes of Coromandel, vol. 2, 1803, p. 22, pl. 26, Vizagapatam).

Serranus formosus VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 311 (Coromandel, Pondicherry, Goa).—RICHARDSON, Ichth. China, Japan, 1846, p. 233 (Canton).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 154 (China, Mauritius).—GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p.

- 23.—DAY, Fishes of Malabar, 1867, p. 7.—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 26 (Singapore).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 150 (Palaboen, Java).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 463 (Luzon, Cavite, Santa Cruz).
- Epinephelus formosus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873–76, p. 44 (Java, Sumatra, Singapore, Borneo, Celebes); vol. 8, 1876–77, pl. (62) 340, fig. 3.
- Petromelapon formosus* FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 521 (Padang, Sumatra).
- Serranus boelang* VALENCIENNES Hist. Nat. Poiss., vol. 2, 1828, p. 308. Seas of the Indies (East Indies); vol. 6, 1830, p. 504 (Ceylon, Sunda Straits, New Guinea).—QUOY and GAIMARD, Voy. Astrolabe, Zool., vol. 2, 1834, p. 657, pl. 3, fig. 4 (Sunda Straits).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 2 (Zanzibar).—WEBER, Semon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 262 (Amboina).
- Epinephelus boelang* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873–76, p. 40 (Sumatra, Nias, Singapore, Bintang, Banka, Java, Celebes, Buru, Amboina, New Guinea).
- Serranus spiloparoeus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 338. No locality (from COMMERSON).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 125 (copied).
- Serranus stigmipomus* RICHARDSON, Ichth. China, Japan, 1846, p. 232. Canton and northwest coast of Australia.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 111 (copied).—MACLEAY, Proc. Linn. Soc. New South Wales, vol. 5, 1880, p. 314 (northwest coast Australia).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 149 (Singapore).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 460 (Luzon, Cavite, Santa Cruz).
- Serranus stigmipoma* KENT, Great Barrier Reef, 1893, p. 369 (Queensland).
- Cephalopholis stigmipomus* JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 19 (Manila).
- Serranus nigro-fasciatus* HOMBRON and JACQUINOT, Voy. Astrolabe, Zool., vol. 3, 1853, p. 36, pl. 2, fig. 1. No locality.—PETERS, Monatsb. Akad. Wiss. Berlin, 1865, p. 105 (reference).—MARTENS, Preuss. Exp. Ost-Asien, vol. 1, 1876, p. 385 (Amboina; Nagasaki Bay).
- Serranus micropirion* (part) GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 116 (Amboyna and China).

Depth $2\frac{3}{4}$ to $2\frac{7}{8}$; head $2\frac{1}{2}$ to $2\frac{3}{5}$, width $2\frac{1}{3}$ to $2\frac{7}{8}$. Snout $4\frac{1}{5}$ to $4\frac{3}{4}$ in head from snout tip; eye $4\frac{2}{5}$ to $5\frac{1}{3}$, 1 to $1\frac{2}{5}$ in snout, greater than interorbital; maxillary extends slightly beyond eye, expansion $\frac{4}{5}$ to 1 in eye, length $1\frac{7}{8}$ to $2\frac{1}{8}$ in head from snout tip; teeth fine, in bands in jaws; pair of front canines in each jaw; minute teeth on vomer and palatines; interorbital 8 to $8\frac{1}{4}$, slightly convex: preopercle edge with inconspicuous minute serrae; opercular spines 3, upper slightly inclined upward and most advanced, median closer to lower. Gill rakers 8 + 16, lanceolate, equal gill filaments or $\frac{1}{2}$ of eye.

Scales 82 to 90 in lateral line to caudal base and 16 to 18 more on latter; tubes 44 to 46 in lateral line and 4 more on latter; 18 to 22 scales above lateral line, 25 to 27 below, 48 to 56 predorsal, 30 rows across cheek; body scales without small basal auxiliary scales; fin bases all finely scaled; scales mostly smooth on head, very small on cheek

and crown; maxillary naked. Scales with 7 basal radiating striae; 36 to 48 apical denticles, in 3 or 4 transverse series; circuli fine.

D. IX, 16, 1, third spine $2\frac{7}{8}$ to $3\frac{3}{5}$ in total head length, twelfth ray $2\frac{1}{5}$ to $2\frac{3}{5}$; A. III, 8, 1 (once III, 6, 1), second spine $2\frac{1}{3}$ to $3\frac{1}{3}$, fourth ray 2 to $2\frac{4}{5}$; caudal $1\frac{1}{2}$ to $1\frac{3}{4}$, rounded; least depth of caudal peduncle $2\frac{4}{5}$ to $2\frac{5}{6}$; pectoral $1\frac{1}{2}$ to $1\frac{3}{4}$; ventral $1\frac{4}{5}$ to 2.

Dark brown, lower parts scarcely paler and fins blackish. Sides with many narrow blue longitudinal stripes extending out on fins and over head. Inside gill opening and mouth tinted with orange. Groove of maxillary pale.

Southern Arabia, Zanzibar, Mauritius, Réunion, India, East Indies, Philippines, China, Japan, Formosa, northwest Australia, Queensland. A very handsome and variable species, easily known by the numerous blue longitudinal lines or narrow bands.

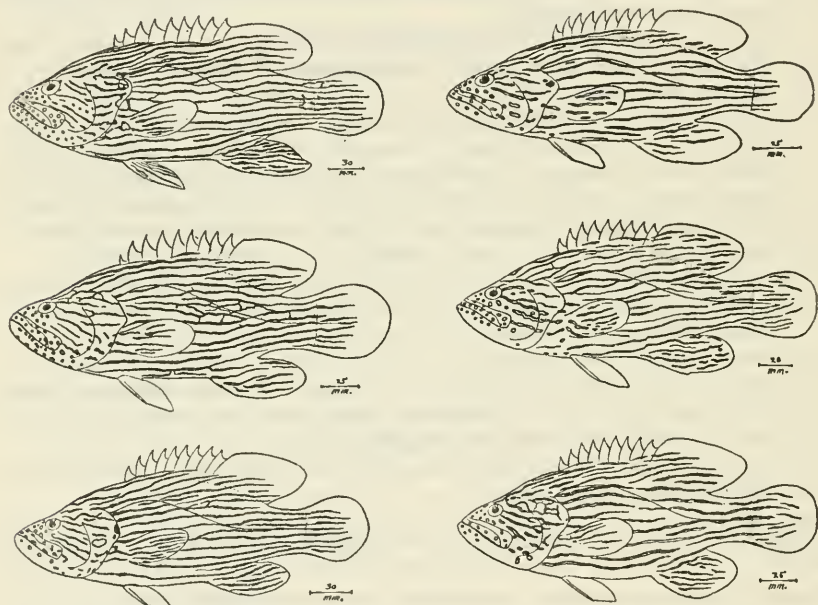


FIGURE 10—*CEPHALOPHOLIS BOENACK* (BLOCH), VARIATION

22786, 22788. Busin Harbor, Burias Island. March 8, 1909. Length 81 to 197 mm.

14540. Butauanan Island, east coast Luzon. June 3, 1909. Length 100 mm.

22050, 22285. Butauanan Island. June 13, 1909. Length 67 to 88 mm.

12368. Candaraman Island, Balabac. June 14, 1909. Length 113 mm.

10971, 10972, 15050, 15052 to 15054, 17074, 17479. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 124 to 182 mm. (1316).

12727, 12728. Capulaan Bay, Pagbilao, Chica Island, vicinity Marinduque Island. February 24, 1909. Length 157 to 182 mm.

5503, 8258, 15881 to 15885. Catbalogan, Samar Island. April 14, 1908. Length 88 to 105 mm.

9326, 8575, 8576, 9322 to 9329, 13005, 13006. Catbalogan. April 15, 1908. Length 80 to 177 mm.

- 6925, 6927, 6929, 6930. Catbalogan. April 16, 1908. Length 131 to 190 mm.
 13179. Cataingan Bay, Masbate Island. April 17, 1908. Length 133 mm.
 16190, 22805, 22806. Cataingan Bay. April 18, 1908. Length 152 to 178 mm.
 7572, 7671. Cebu market. April 4-6, 1908. Length 151 to 175 mm.
 10925 to 10928. Endeavor Strait, Palawan. December 23, 1908. Length 126 to 165 mm.
 14100, 14101, 14104. Endeavor Strait. December 24, 1908. Length 140 to 153 mm.
 18279. Galera Bay, Mindoro Island. June 9, 1908. Length 129 mm.
 7192. Ganda Island, between Jolo and Tawi Tawi. September 20, 1909. Length 206 mm.
 15790. Makesi Island, Palawan. April 5, 1909. Length 188 mm.
 19291. Malapascua Island, north of Cebu. March 16, 1909. Length 125 mm.
 6295 to 6297. Manila market. June 13, 1908. Length 230 to 248 mm. (97, 99).
 6326. Manila market. July 11, 1908. Length 250 mm.
 6717. Manila market. December 4, 1908. Length 255 mm.
 6741. Manila market. April 14, 1909. Length 278 mm.
 16495. Masamat Bay, Quinalasag Island. June 12, 1909. Length 64 mm.
 5791 to 5795, 16673, 17279 to 17284. Nabatas Point, Samar Island. July 24, 1909. Length 48 to 177 mm. 12 examples.
 9611. Pagapas Bay, Luzon. February 20, 1909. Length 161 mm.
 6132. Port San Pio Quinto, Camiguin Island, China Sea, vicinity of Batanes. November 10, 1908. Length 175 mm.
 18630. Saboon Island, Ragay Gulf, Luzon. March 10, 1909. Length 72 mm. (1295).
 14748, 14749. San Januico Strait, off east coast Leyte. April 13, 1908. Length 128 to 130 mm.
 9114, 9129. San Roque, Leyte. July 29, 1909. Length 241 to 310 mm.
 12211. Santa Cruz Island, Marinduque. April 24, 1908. Length 172 mm.
 19588. Sinalue Island, north of Tawi Tawi Group. September 22, 1909. Length 92 mm. (1971).
 12197. Tataan, Sinalue Island, Tawi Tawi Group. February 20, 1908. Length 172 mm.
 8693. Tutu Bay, Jolo Island, second anchorage. September 19, 1909. Length 146 mm.
 5048. Sandakan Bay, Borneo. February 29, 1908. Length 240 mm.
 13485. Basa Reef, Gulf of Boni, Celebes. December 17, 1909. Length 165 mm.
 21432. Dodepo and Pasejogo Islands, Gulf of Tomini, Celebes. November 16, 1909. Length 111 mm.
 17993. Limbe Strait, Celebes. November 10, 1909. Length 160 mm.
 21448. Makassar Island. December 16, 1909. Length 150 mm.
 A1417. Makassar market. December 22, 1909. Length 312 mm.
 11663. Kowloon market, China. October 5, 1908. Length 164 mm.
 12390, 12391. Hong Kong market, China. August 13, 1908. Length 114 to 176 mm.

CEPHALOPHOLIS ROGAA (Forskål)

Perca rogaa FORSKÅL, Descript. Animal., 1775, p. 38. Djedda, Red Sea.—
 BONNATERRE, Tabl. Ichth., 1788, p. 131 (Red Sea).—GMELIN, Syst. Nat.
 Linn., vol. 1, 1789, p. 1315 (Arabia).—WALBAUM, Artedi Pisc., vol. 3,
 1792, p. 344 (on FORSKÅL).

Bodianus rogaa SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 334 (Red Sea).—
 LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 282, 296 (Arabia).—FOWLER,
 Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 522 (Padang,
 Sumatra).

Serranus rogae VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 349 (on FORSKÅL).—RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 105, pl. 26, fig. 1 (Red Sea).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 116 (Red Sea).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 2 (Zanzibar).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 679 (Koscir, Red Sea); Fische Roth. Meer., 1884, p. 3.—BOULENGER, Proc. Zool. Soc. London, 1889, p. 238 (Muscat).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 71, pt. 1, 1907, p. 124 (Bal Hâf, Socotra).

Serranus rogan MARTENS, Verh. zool. bot. Ges. Wien, vol. 16, 1866, p. 378 (Red Sea).

Serranus (Epinephelus) rogae ZUGMAYER, Abh. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 9 (Oman).

Epinephelus rogae BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 185 (Red Sea, Zanzibar, Muscat, Ceylon).

Cephalopholis rogae FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 252 (Padang material).

Perca lunaria FORSKÅL, Descript. Animal., 1775, pp. xi, 39. Djedda and Lohaja, Red Sea.—BONNATERRE, Tabl. Ichth., 1788, p. 131 (Red Sea).—GMELIN, Syst. Nat. Linn., vol. 1, 1789, p. 1316 (Arabia).—WALBAUM, Artedi Pisc., vol. 3, 1792, p. 344 (on FORSKÅL).

Bodianus rogae var. *lunaria* SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 335 (Red Sea).

Serranus lunaria RÜPPELL, Neue Wirbelth., Fische, 1835, p. 90 (note).

Depth $2\frac{1}{4}$ to $2\frac{1}{3}$; head $2\frac{2}{5}$ to $2\frac{3}{5}$, width $2\frac{2}{5}$ to $2\frac{1}{5}$. Snout $3\frac{1}{4}$ to $3\frac{1}{2}$ in head from snout tip; eye $6\frac{1}{3}$ to $7\frac{2}{3}$, 2 to $2\frac{2}{5}$ in snout, slightly greater than interorbital to $1\frac{1}{5}$ with age; maxillary not quite reaching opposite hind eye edge in young to little beyond with age, expansion little greater than eye or $5\frac{2}{5}$ to $6\frac{1}{8}$ in head, length $1\frac{7}{8}$ to 2 in head from snout tip; teeth conic, sharp, inner depressible and outer row slightly enlarged; 3 rows of mandibular teeth narrowing to single inner large depressible row posteriorly; pair of front canines in each jaw; minute teeth on vomer and palatines; interorbital $6\frac{2}{5}$ to $6\frac{3}{4}$, convex, steep; minute and irregular serrae on preopercle edge, all obsolete with age; upper opercle spine well separated and little advanced from others. Gill rakers 11 + 15, of which 5 to 9 rudiments above and below, much longer than gill filaments or $\frac{5}{8}$ of eye.

Scales 96 to 100 + 18 to 20 in lateral line; pores 50 to 53 + 2 to 5; 22 or 23 above, 29 to 44 below, 80 predorsal scales; 27 to 29 rows across cheek to preopercle angle; scales on head smooth, small on maxillary, covering its upper half; fins with greater portion basally covered with small scales; with age greater part of head above and back with many small auxiliary scales. Scales with 6 or 7 basal radiating striae; 47 to 57 apical denticles with 5 to 8 transverse series; circuli rather fine.

D. IX, 17, 1 or 18, 1, third spine $2\frac{1}{5}$ to $3\frac{1}{6}$ in total head length, eleventh ray $1\frac{2}{3}$ to $2\frac{1}{3}$; A. III, 9, second spine $3\frac{1}{5}$ to 4, fifth ray $1\frac{2}{3}$ to 2; caudal $1\frac{1}{2}$ to $1\frac{2}{3}$, broadly truncate; least depth of caudal peduncle $2\frac{1}{4}$ to $2\frac{2}{5}$; pectoral $1\frac{1}{2}$ to $1\frac{2}{3}$; ventral $1\frac{1}{2}$ to $1\frac{3}{5}$.

In alcohol uniform blackish brown, fins blackish. Young with hind edges of soft dorsal, soft anal and caudal whitish, latter broadly so

in crescent. Inside gill opening and all of folds of bones of head, together with inside of mouth, orange. Iris yellowish, blue or brown with preservation. Caudal margin narrowly gray white. Inside pectoral rays blackish green, in young fin subterminally with large dull brown blotch. Axil of pectoral livid orange.

Red Sea, Arabia, Zanzibar, Ceylon, East Indies, Philippines. A very strongly marked species, easily known by its dark or blackish coloration.

15976. Bugsuk Island, North Balabac Strait. January 5, 1909. Length 132 mm.

7857. Cagayan de Jolo. January 8, 1909. Length 262 mm.

7736. Caxisigan Island, North Balabac Strait. January 2, 1909. Length 315 mm.

12243. Lampinigan Island, south of Zamboanga. September 11, 1909. Length 181 mm.

6790. Malanipa Island, east of Zamboanga. September 8, 1909. Length 305 mm.

8370. Malapascua Island, north of Cebu. March 16, 1909. Length 410 mm.

9294. Murcielagos Bay, Mindanao. August 9, 1909. Length 229 mm.

8477. Rasa Island, eastern Palawan. April 1, 1909. Length 405 mm.

A659. Simaluc Sibi Sibi Island, north of Tawi Tawi. September 23, 1909. Length 214 mm.

7360, 7361. Tara Island, Mindoro Strait. December 15, 1908. Length 233 to 241 mm.

A734. Danawan and Si Amil Islands, Sibuko Bay, Borneo. September 27, 1909. Length 325 mm.

A772. Mabul Island, Sibuko Bay, Borneo. September 29, 1909. Length 252 mm.

A1174, A1184. Gane Road, Gillolo Island. December 1, 1909. Length 332 to 400 mm.

A1408. Tapiantana Island. December 21, 1909. Length 282 mm.

A1530. Doc Can Island, Sulu Sea. January 7, 1910. Length 282 mm.

CEPHALOPHOLIS ALBOMARGINATUS, new species

Depth $2\frac{2}{3}$ to $2\frac{4}{5}$; head 3 to $3\frac{1}{8}$, width 2 to $2\frac{1}{8}$. Snout $3\frac{3}{4}$ to 4 in head from snout tip; eye $5\frac{3}{4}$ to $6\frac{1}{3}$, $1\frac{1}{2}$ to $1\frac{3}{5}$ in snout, $1\frac{2}{5}$ to 2 in interorbital; maxillary very oblique, reaches opposite hind eye edge or slightly beyond, expansion 1 to $1\frac{1}{4}$ in eye, length $1\frac{7}{8}$ to 2 in head from snout tip; teeth villiform, in narrow bands in jaws, at least anteriorly, some of anterior inner upper ones little enlarged and hinged; outer row of still larger ones around upper jaw with 2 wide set front canines; lower jaw with 2 closer front canines, resolving into 2 lateral rows of teeth, outer smaller though inner row of larger teeth hinged and long as front canines; bands of villiform teeth on each palatine and across vomer, none on tongue; nostrils together, front one with tubular flap, apertures alike, close before upper front eye edge; interorbital $3\frac{4}{5}$ to $4\frac{2}{5}$, convex; hind preopercle edge very minutely serrated, feebly or obscurely so with age; opercular spines 3, lowermost forward and median closer to lower. Gill rakers 9 + 17, lanceolate, slightly longer than gill filaments or $1\frac{1}{4}$ in eye; 8 above and 6 below rudimentary.

Scales 110 to 117 in lateral line to caudal base and about 12 to 15 more on latter; tubes 68 to 73 in lateral line to caudal base and 2 or 3 more on latter; 16 or 17 scales above lateral line, 31 or 32 below, 57 to 70 predorsal nearly to snout end, 23 to 26 rows obliquely down over cheek to preopercle angle; all fins more or less finely scaled basally; scales with 14 or 15 rows transversely across maxillary expansion. Scales with 5 or 6 basal radiating striae; apical denticles 28 to 52, close set, compact, in 5 to 13 transverse series; circuli moderately small, become coarser apically.

D. IX, 15, 1, first spine 5 to $5\frac{1}{3}$ in total head length, ninth spine $2\frac{7}{8}$ to 4, first ray $2\frac{7}{8}$ to $3\frac{1}{8}$; A. III, 9, 1, third spine $3\frac{1}{8}$ to $3\frac{2}{3}$, fourth ray $2\frac{1}{5}$ to $2\frac{1}{4}$; caudal $1\frac{1}{4}$ to $1\frac{1}{3}$, slightly emarginate or concave; least depth of caudal peduncle $2\frac{1}{5}$ to $2\frac{1}{3}$; pectoral $1\frac{3}{5}$ to $1\frac{2}{3}$; ventral $1\frac{4}{5}$ to $1\frac{7}{8}$.

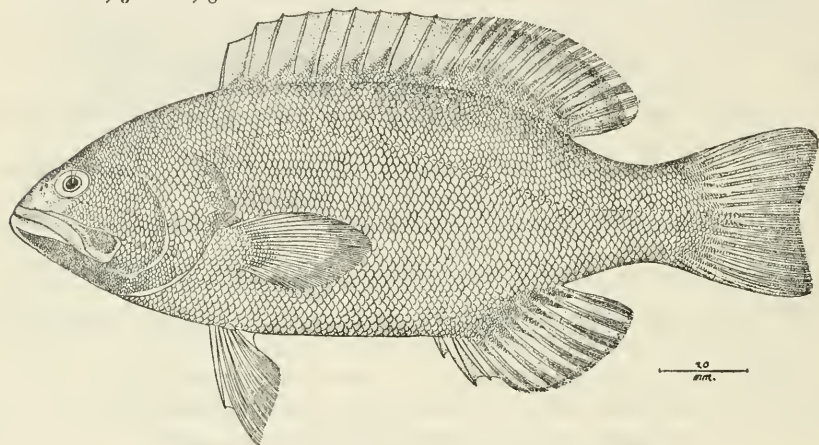


FIGURE 11.—*CEPHALOPHOLIS ALBOMARGINATUS*, NEW SPECIES

Largely deep umber brown, more or less uniform or lower surfaces scarcely paler. Four obscure blue lines horizontally on head, first above eye back on opercle, second from near snout end, third along maxillary groove, and fourth over maxillary and posteriorly. Iris brownish. Dorsals largely dusky, soft fin with broad, contrasted whitish upper border. Caudal and anal dusky brown, anal sometimes with lower edge pale. Pectoral brown basally, terminally whitish to dull yellowish, sometimes over outer half of fin. Ventral dusky.

East Indies and Philippines.

Diagnosis. Allied with *C. polleni* and *C. rogaa*, but differing at once in coloration, also its caudal fin is emarginate. Our series shows a fairly constant color pattern, the greatest variation in the extent of the pale terminal area on the pectoral fin. In preserved examples the blue lines on the head become quite obscure. The species may easily be known by its broad pale border to the soft dorsal and its general dusky brown coloration.

6565. Port Maricaban, southern Luzon. July 21, 1908. Length 330 mm.
 7312. Sablayan Bay, Mindoro. December 12, 1908. Length 298 mm.
 A718. Danawan Island, vicinity of Sibuko Bay, Borneo. September 27, 1909.
 Length 361 mm. (Type.—Cat. No. 89985 U.S.N.M.).
 A1515. Birabirahan Island, Borneo. December 31, 1909. Length 291 mm.
 A738, A747. Sipadan Island, vicinity Sibuko Bay, Borneo. September 28, 1909.
 Length 276 to 290 mm.
 (2102). Dutch East Indies. December 1, 1909. Length 185 mm.
 A969. Binang Unang Island, Celebes. November 17, 1909. Length 273 mm.
 A1032. Buka Buka Island, Celebes. November 20, 1909. Length 266 mm.
 A1042. West of Malibagu Point, Celebes. November 21, 1909. Length 293 mm.
 A1161, A1173, 13030, 19945. Gane Road, Gillolo Island. December 1, 1909.
 Length 155 to 288 mm. (2101).
 A1111. Makyan Island. November 28, 1909. Length 283 mm.
 A1066. Tidore Island, south of Ternate. November 25, 1909. Length 292 mm.

Genus *SERRANUS* Cuvier

- Serranus* CUVIER, Règne Animal, vol. 2, 1817, p. 76. Type *Perca gigas* BRÜNNICH, designated by FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 252.
Daba FORSKÅL, Descript. Animal., 1775, p. 44. Type *Perca areolata* FORSKÅL, tautotypic vernacular. (Inadmissible.)
Chrysomelanus (PLUMIER) LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1803, p. 160. Type *Chrysomelanus piscus* (PLUMIER) LACÉPÈDE = *Sparus chrysomelanus* LACÉPÈDE, tautotypic. (Inadmissible.)
Merou (CUVIER) BONAPARTE, Prosp. Syst. Itt. Gen., 1831, p. 101. Type *Perca gigas* BRÜNNICH, designated by JORDAN, Genera of Fishes, pt. 2, 1919, p. 175.
Cerna BONAPARTE, Fauna Italica, Pesc. (Introd. Class. Poiss.), vol. 3, pt. 1, 1833–41, no pagination. Type *Perca gigas* BRÜNNICH, monotypic.
Cynichthys SWAINSON, Lardner's Cab. Cyclop. (Nat. Hist. Animals), Fishes, vol. 2, 1839, pp. 168, 201. Type *Perca flavopurpurea* BENNETT, monotypic.
Hyporthodus GILL, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 98. Type *Hyporthodus flavicauda* GILL, monotypic.
Schistoris GILL, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 98. Type *Serranus mystacinus* POEY, monotypic.
Labroperca GILL, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 236. Type *Serranus labriformis* JENYNS, orthotypic.
Priacanthichthys DAY, Proc. Zool. Soc. London, 1868, p. 193. Type *Priacanthichthys maderaspatensis* DAY, monotypic.
Merus POEY, Ann. Lyc. New York, vol. 10, 1871, p. 39. Type *Perca gigas* BRÜNNICH, orthotypic.
Homalogrystes ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 268. Type *Homalogrystes güntheri* ALLEYNE and MACLEAY, monotypic.
Hyposerranus KLUNZINGER, Fische Roth. Meer., 1884, p. 3. Type *Serranus morrhua* VALENCIENNES, designated by JORDAN, Genera of Fishes, pt. 4, 1920, p. 429.
Phrynotitan GILL, Standard Nat. Hist., vol. 3, 1885, p. 255. Type *Batrachus gigas* GÜNTHER, orthotypic.

Body stout, compressed. Mouth large. Maxillary with supplemental bone well developed. Enlarged teeth of inner series of each

jaw depressible. Canines few, large, in front of jaws. Nostrils well separated. Preopercle moderately serrated on hind edge, lower limb entire, without distinct antrorse spine. Opercle with 2 strong spines. Gill rakers short, rather few. Pyloric appendages 10 to 20. Scales small, ctenoid, often somewhat imbedded in skin. Maxillary usually with small scales. Soft vertical fins usually more or less scaly. Lateral line complete, scales triangular, cycloid. Dorsal spines about 11, seldom 10, not filamentous, last ones somewhat shorter than median, rays 14 to 18. Anal spines 3, second usually largest, rays 7 to 9. Caudal rounded or lunate. Pectoral rays 15 to 20, rounded, short, rarely symmetrical. Ventral moderate, inserted below pectoral, each with strong spine, fins close together.

A large genus, the principal one of the family and widely distributed in most tropical seas. Very many species have been described, though many of them extremely variable in color, pleasing and brilliant. Many are highly valued as food fishes and some reach a large size.

The present genus seems to us perhaps most typical of all fishes. In every way its members are the most perfected or typical development of true bony fishes. From it and its allies all the various offshoots of the percoid series seem to graduate or become variously modified. We have nothing to advance in phylogeny, having adopted in the main the distinctions used by Boulenger in his excellent catalogue of the British Museum materials. We hardly think that the emphasis placed on osteological or internal characters, in both this genus and others of the family, are sufficiently complete or practical to be of much service at present.

Although our series of individuals are extensive the species represented are comparatively few of those generally distributed in the Indo-Pacific as a whole. Frequently the species are difficult to distinguish; so great are the variations in both color and structure. Even after close comparisons have been made it is often not easy to assign very young specimens to their respective species. In some cases this is hardly possible without completed graduated series of materials well toward adult conditions. It therefore seems desirable for us to recommend to future investigators the collecting of all young tropical serranids whenever possible. Even many of the more frequently collected species have color phases rarely or seldom secured.

Homalogrystes Alleyne and Macleay is correctly a synonym of *Serranus*. Its association with *Acanthochromis* in volume 7, page 27 of the present bulletin, is wrong, as its genotype proves to be a synonym of *Serranus taurinus*.

ANALYSIS OF THE SPECIES

*a*¹. CYNICHTHYS. Mandibular teeth biserial at all ages.

*b*¹. Body with 6 to 12 longitudinal bluish lines on pale olive or reddish ground color; edges of spinous dorsal membranes black; ventrals dark brown terminally-----*undulosus*

*b*². Body without fine longitudinal lines.

*c*¹. No dark or transverse blackish bands at any age.

*d*¹. Brown, with undulous oblique streaks or rows of dark spots, ascending toward dorsal, remnants of 3 oblique dark bands, well marked in young; 3 or 4 dark oblique streaks on side of head; soft dorsal and caudal spotted with darker; caudal round in young-----*morhua*

*d*². No oblique dark streaks or rows of spots ascending toward dorsal.

*e*¹. Spots on body minute or rounded, not forming narrow separating network of pale lines.

*f*¹. Head and body pale lilac to dark purplish blue, with numerous minute dark dots; pectoral uniform pale yellow; depth $2\frac{1}{2}$ to $2\frac{3}{4}$ -----*flavo-caeruleus*

*f*². Spots larger; depth $2\frac{1}{2}$ to $3\frac{1}{4}$.

*g*¹. Gray, with numerous large yellow or reddish spots on body and fins; soft vertical fins with black margin, edged yellow-----*areolatus*

*g*². Dark purplish brown, paler below; uniform or with scattered subcircular yellowish or whitish spots on body, dorsal and upper third of caudal; spots small when present on head; dorsal and anal blackish terminally, sometimes narrowly edged white; pectoral orange-----*coromandelicus*

*g*³. Above brown, rounded blackish spots everywhere; young dark, with round black spots and some large blue white blotches, largest as predorsal cross bar down to opercle and vertical bar on hind half of spinous dorsal down to lateral line-----*fario*

*e*². Spots on body variable and unequal, but separated by pale or whitish network of lines.

*h*¹. Pectoral $1\frac{1}{2}$ to $1\frac{3}{4}$ in head.

*i*¹. Gray or brownish white to pale olive, covered all over with very numerous dark olive brown or blackish, round or hexagonal spots, separated by very narrow, often linear intervals of pale ground color; spots smaller and more numerous with age; fins spotted like body; soft dorsal and caudal sometimes with very narrow white edge-----*chlorostigma*

*i*². Head and body covered all over with unequal spots, some black, some brown, separated by pale or whitish polygonal network; vertical fins with large, round, dark-brown or black spots; caudal with narrow white edge; pectoral dark terminally, edge narrowly white-----*gilberti*

*h*². Pectoral nearly or quite long as head; brown, with large, darker, unequal spots separated by pale polygonal network; vertical fins with large, round, dark-brown spots; pectoral brown or blackish, uniform or spotted-----*megachir*

c². Body with dark transverse bands.

j¹. Spinous dorsal membranes not black or darker marginally than rest of fin.

k¹. Brown, with 5 or 6 inclined transverse bands, sometimes paired or last 2 or 3 may fork or divide below; body mottled and spotted as well as banded; pectoral pale.-----**fasciotomaculatus**

k². Vertical bands 5 or 6, not inclined.

l¹. Brown, with or without small darker spots; fins uniform, dark terminally; often dark, oblique streaks on cheek.-----

l². Brown, transverse dark bands variably broken below lateral line into spots; oblique dark streaks from eye to cheek and opercle.-----**diacanthus**

l³. Brown or olive, with yellowish round spots and 5 or 6 black vertical bands which may be paired; dorsal and caudal with round black spots; pectoral yellowish; ventral blackish terminally.-----**brunneus**

j². Spinous dorsal membranes broadly edged black; body red or pale brown, with or without dark vertical bands, with or without blue white spots.-----**sexfasciatus**

with or without blue white spots.-----**fasciatus**

m¹. Brown, each scale on body and bases of fins with very small white dot; vertical fins brown, paired fins orange.-----**rhyncholepis**

m². No fine white dots, or as one on each scale.

n¹. Very numerous dark brown spots all over body, head and fins, separated by honeycombed network of light lines and some spots by being dark may form cross bars; sometimes scattered white dots on body; sometimes 3 large black blotches on back at dorsal bases and another behind dorsal on caudal peduncle.-----**merri**

n². No fine honeycomb network of light lines.

o¹. Purplish brown, with 5 dark transverse vertical bands which extend on dorsals, on body forming 2 pairs with single band on caudal peduncle.-----**awaora**

o². Dark transverse bands, when present, not paired.

p¹. Usually 2 to 5 dark blotches on back and often another on caudal peduncle above.

q¹. Pale brown, with round dark or black spots all over, smaller and more numerous with age; paired fins usually blackish; all fins with narrow yellowish white edge.-----**corallicola**

a². SERRANUS.

- q*². Dark purplish brown, with more or less distinct round whitish spots, large and form black edged ocellus in young; maxillary groove edged black; fins with or without light dots. *caeruleo-punctatus*
- q*³. Brown above, with more or less numerous small yellowish or gray white round spots; interspaces between may form reticulate or undulous oblique lines; large pale round blotches may be present in addition to small spots; maxillary groove edged black; vertical fins covered with yellowish round spots and edged yellowish. *summana*
- q*⁴. Young gray or pale-brown above, with large dark-brown spots or irregular marblings, with or without numerous small, round, dark-brown or black spots; with age markings indistinct and speckled all over with black. *fusco-guttatus*
- p*². Brown, with 4 or 5 distinct dark transverse vertical bands.
- r*¹. Frequently with well-defined white and black dots, wide apart in young, increase in number with age; old examples dark brown, closely dotted black. *tauvina*
- r*². Head, body and fins with large, obscure or poorly defined darker brown spots or blotches, though not on chest or belly; dark saddles or cross bands indistinct with age. *malabaricus*

SERRANUS UNDULOSUS (Quoy and Gaimard)

Bodianus undulosus QUOY and GAIMARD, Voy. Uranie, Zool., 1824, p. 310. Waigiü and Rawak.

Epinephelus undulosus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 46, pl. (10) 283, fig. 3 (Celebes, Amboina, Waigiü).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 199 (Ceylon, Madras, China, Mysol).—REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, 1905, p. 329 (Sea of Oman, 107 to 170 fathoms).—SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 242 (Zamboanga).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 201 (Saleyer).

Serranus undulosus DAY, Fishes of India, pt. 1, 1875, p. 13, pl. 2, fig. 1 (Madras); Fauna Brit. India, vol. 1, 1889, p. 446.—PEARSON, Rep. Gov. Marine Biol., Ceylon, 1912-13, pt. 4, p. E13 (Cheval Paar Group, between Cheval Paar and Muttuvaratu; between Talavella and Chilaw).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 177 (Shortland Island).

Serranus lincatus VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 312. Pondicherry.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 156 (China); Cruise of Curaçoa Brenchley, 1873, p. 410 (Misol, Moluccas).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 433 (Luzon, Cavite, Santa Cruz).

Serranus amboinensis BLEEKER, Nat. Tijds. Ned. Indië, vol. 3, 1852, p. 258 (Amboina).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 156 (Ceylon).

Depth $2\frac{3}{4}$ to $2\frac{7}{8}$; head $2\frac{3}{5}$ to $2\frac{2}{3}$, width $2\frac{1}{4}$ to $2\frac{1}{2}$. Snout $3\frac{1}{3}$ to $4\frac{1}{5}$ in head from snout tip; eye $4\frac{1}{5}$ to $6\frac{2}{3}$, 1 to $1\frac{4}{5}$ in snout, greater than interorbital to $1\frac{2}{5}$ in interorbital; maxillary reaches $\frac{3}{4}$ to or opposite hind eye edge, expansion $1\frac{1}{3}$ to $1\frac{3}{5}$ in eye, length 2 to $2\frac{1}{8}$ in head from snout tip; teeth in narrow bands, biserial along sides of mandible; pair of small canines in front of each jaw; narrow band of fine teeth on vomer and each palatine; interorbital $5\frac{1}{5}$ in head from snout tip, convex; hind preopercle edge minutely denticulate and 3 slightly larger teeth at angle; median opercular spine nearer lower and upper most advanced. Gill rakers 14+20, lanceolate, little longer than gill filaments or $1\frac{1}{5}$ in eye.

Scales 96 to 104 in lateral line to caudal base with 12 to 15? more on latter; tubes 60 to 66 in lateral line to caudal base and 5 to 7 more on latter; 20 or 21 scales above lateral line, 34 to 36 below, 57 to 67 predorsal, 30 to 32 rows across cheek to preopercle angle; body scales each with many fine basal auxiliary scales; fins all covered with fine basal scales; maxillary expansion largely finely scaled above. Scales with 2 to 5 basal radiating striae; 30 to 32 apical denticles, with 5 to 7 transverse series; circuli fine.

D. X or XI, 19, 1, or 18, 1 third spine $2\frac{2}{3}$ to 3 in total head length, first ray $2\frac{2}{3}$ to $2\frac{7}{8}$; A. III, 8, 1, third spine $3\frac{1}{3}$ to $4\frac{1}{5}$, fifth ray $2\frac{1}{5}$ to $2\frac{2}{5}$; caudal $1\frac{1}{2}$ to $1\frac{2}{3}$, truncate; least depth of caudal peduncle $3\frac{1}{3}$ to $3\frac{2}{3}$; pectoral $1\frac{3}{4}$ to $2\frac{1}{10}$; ventral $1\frac{3}{4}$ to 2.

Drab brown, pale and much lighter on under surface of head, tail and abdomen. Back and upper sides with about 12 dark brown longitudinal lines, little inclined upward posteriorly and with alternating paler lines within interspaces, these often variously incomplete.

Iris brown. Membrane of spinous dorsal blackish marginally. Pectoral pale brown. Ventral dusky terminally.

Arabia, India, Ceylon, East Indies, Philippines, China, Melanesia.

5186. Jolo market, Jolo. March 7, 1908. Length 332 mm.

18673. Hinunangan Bay, Leyte Island. July 30, 1909. Length 132 mm. (1783).

One example. Ulugan Bay, Palawan Island. December 29, 1908. Length 94 mm. (979). Slaty brown on back, under parts lighter. Below dorsal line of dark greenish brown, extending full length of dorsal. On back and upper side are similar lines, oblique and more or less broken. On head and nape and behind eye are small spots of same color. Spinous dorsal with smoky margin. Soft dorsal clear. Anal clear, similar to color on back but lighter. Caudal same. Pectoral like color of side. Ventral dark smoky.

SERRANUS MORRHUA Valenciennes

Serranus morrhua VALENCIENNES, Hist. Nat. Poiss., vol. 9, 1833, p. 434.

Mauritius.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 254 (copied).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 678 (Red Sea).—DAY, Fishes of India, pt. 1, 1875, p. 21, pl. 5, fig. 1 (Madras).

Serranus (Hyposerranus) morrhua KLUNZINGER, Fische Roth. Meer., 1884, p. 3, pl. 1, fig. 2 (Kosier).—DAY, Fauna Brit. India, vol. 1, 1889, p. 453.—BOULENGER, Proc. Zool. Soc. London, 1889, p. 244.

Serranus (Epinephelus) morrhua ZUGMAYER, Abh. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 9 (Oman).

Epinephelus morrhua SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 65, pl. 7, fig. 1.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 208 (Red Sea, Muscat, Mauritius).—JORDAN and SNYDER, Annot. Zool. Japon., vol. 3, 1901, p. 74 (Nagasaki).—JORDAN and RICHARDSON, Proc. U. S. Nat. Mus., vol. 37, 1910, p. 454, fig. 11 (Tokyo).—WEBER, Siboga Exp., vol. 57, 1913, Fische, p. 202 (Bara, Buru Straits).—JORDAN and THOMPSON, Mem. Carnegie Mus., vol. 6, No. 4, 1914, p. 249 (Misaki).—JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 235 (Toba).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 476 (Natal and Zululand coast).

Serranus poecilonotus SCHLEGEL, Fauna Japon., Poiss., pt. 1, 1842, p. 6, pl. 4, fig. 1. Nagasaki.—RICHARDSON, Ichth. China, Japan, 1846, p. 233 (copied).—BLEEKER, Verh. Batav. Genootsch., vol. 26, 1857, No. 4, p. 61 (Nagasaki).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 155 (copied).

Epinephelus poecilonotus SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 414 (Misaki).

Serranus angularis (not CUVIER) GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 126 (Mauritius).

Serranus radiatus DAY, Proc. Zool. Soc. London, 1867, p. 699. Near Madras.

Serranus (Epinephelus) brunneus (not BLOCH) STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 47, 1883, p. 230, pl. 5, figs. 1–2 (Japan).

Epinephelus latifasciatus (not SCHLEGEL) JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 354 (Yokohama).

Epinephelus döderleini FRANZ, Abh. Bayer. Akad. Wiss., Suppl., vol. 1, 1910, p. 35. Yokohama, Dzushi.—TANAKA, Figs. Descript. Fishes Japan, vol. 35, June 20, 1927, p. 654, pl. 153, fig. 423 (Tanahe).

Depth 3; head $2\frac{1}{3}$, width $2\frac{1}{5}$. Snout $3\frac{4}{5}$ in head from snout tip; eye $5\frac{1}{2}$, $1\frac{2}{5}$ in snout, greater than interorbital; maxillary reaches $\frac{3}{4}$ in eye, expansion $1\frac{3}{5}$, length $2\frac{1}{10}$ in head from snout tip; teeth in

narrow bands in jaws, rather long and slender, biserial along sides of mandible; pair of canines in front of each jaw; bands of small teeth on vomer and palatines; interorbital $6\frac{1}{4}$, slightly convex; hind preopercle edge with small blunt denticles, 3 enlarged at angle; median opercular spine nearer lower and upper most advanced. Gill rakers 7+14, lanceolate, slender, longer than gill filaments or $\frac{1}{2}$ of eye; 6 above and 4 below rudimentary.

Scales 108 in lateral line to caudal base and 10? more on latter; tubes 58 in lateral line to caudal base and 4? more on latter; 22 scales above lateral line, 33 below, 78 predorsal, 33 rows across cheek to preopercle angle; body scales with small basal auxiliary scales except on predorsal and head above; fins all with fine basal scales; maxillary naked. Scales with 7 to 9 basal radiating striae; 24 to 32 apical denticles, with 3 series transversely; circuli fine.

D. XI, 15, 1, third spine $3\frac{1}{5}$ in total head length, first ray $3\frac{1}{6}$; A. III, 7, 1, third spine 4, third ray $2\frac{1}{3}$; caudal 2, truncate, rounded convexly behind as expanded; least depth of caudal peduncle $4\frac{1}{8}$; pectoral 2; ventral $2\frac{1}{2}$.

Uniform blackish brown, apparently stained in preservative. Some still darker obscure horizontal streaks, ascending slightly posteriorly. Several dark, oblique streaks on side of head.

Red Sea, Arabia, Zululand, Natal, Mauritius, Madagascar, India, East Indies, Philippines, Japan. We have but a single example.

4839. Jolo market, Jolo. February 11, 1908. Length 350 mm.

SERRANUS FLAVO-CAERULEUS (Lacépède)

Holocentrus flavo-caeruleus LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 331, 367. Mauritius.

Serranus flavocaeruleus VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 297 (Mauritius).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 145 (Mauritius and Ceylon).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 10 (Zanzibar).—DAY, Fishes of India, pt. 1, 1875, p. 15, pl. 3, fig. 1 (Andamans); Fauna Brit. India, vol. 1, 1889, p. 448.—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 177 (Gilbert and Ebon Islands).

Serranus flavocaeruleus PETERS, Arch. Naturg., 1855, p. 236 (Mozambique).

Epinephelus flavocaeruleus PETERS, Monatsb. Akad. Wiss. Berlin, 1876, p. 435 (Mauritius).—GÜNTHER, Trans. Roy. Soc. London, vol. 168, 1879, p. 470 (Rodriguez).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 62.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 198 (Zanzibar, Mauritius, Rodriguez, Ceylon, Madras, China, Formosa, Mortlock, Micronesia, Ponapé).—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 13, 1907, p. 204 (Tulear Bay, Madagascar).—GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol. 13, pt. 3, 1914, p. 67 (Natal).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 475 (Natal coast).

Epinephelus flavocaeruleus var. *flavocaeruleus* STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 71, pt. 1, 1907, p. 125 (Gischin, Makalla, Socotra).

Holocentrus gymnosus LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1802, pl. 27, fig. 2; vol. 4, 1802, pp. 335, 372. Chinese manuscripts.

Bodianus macrocephalus LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1802, pl. 20, fig. 3; vol. 4, 1802, pp. 281, 293. No locality. (On COMMERSON.)

Serranus borbonicus QUOY and GAIMARD, Voy. Uranie, Zool., Dec. 18, 1824, p. 312, pl. 57, fig. 2. Bourbon Island.

Serranus borbonius GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 23.

Perca flavopurpurea BENNETT, Fishes of Ceylon, 1828-30, pl. 19. Ceylon.

Serranus hoedtii BLEEKER, Nat. Tijds. Nederland. Indië, vol. 8, 1855, p. 406.

Amboina.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 139 (copied);

Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 9, pl. 8, fig. A (Kingsmills).

Epinephelus hoedti BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 45, pl. (5) 283, fig. 2 (Celebes; Amboina).—JORDAN and EVERMANN, Proc.

U. S. Nat. Mus., vol. 25, 1902, p. 342 (Formosa).

Epinephelus hoedtii OGILBY, Mem. Queensland Mus., vol. 1, 1912, p. 50 (Moreton Bay).

Serranus punctatissimus GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 144. China.

Epinephelus flavocoeruleus var. *melanometopon* BLEEKER, Nat. Tijds. Dierk., vol. 4, 1874, p. 96 (Bourbon Island); Rech. Faun. Madagascar, Pollen, pt. 4, 1877, p. 17 (Borbonia).

Epinephelus flavocoeruleum var. *xanthometopon* BLEEKER, Nat. Tijds. Dierk., vol. 4, 1874, p. 97 (on *Holocentrus flavocoeruleus* LACÉPÈDE).

Homalogrystes luctuosus DE VIS, Proc. Linn. Soc. New South Wales, vol. 7, 1882, p. 369. Brisbane, Queensland.

Depth $2\frac{1}{2}$ to $2\frac{3}{5}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{2}{5}$ to $2\frac{3}{5}$. Snout $3\frac{7}{8}$ to 4 in head from snout tip; eye $5\frac{2}{3}$ to 6, $1\frac{1}{4}$ to 2 in snout, $1\frac{1}{8}$ to $1\frac{1}{3}$ in interorbital; maxillary reaches $\frac{1}{2}$ to $\frac{3}{4}$ in eye, expansion $1\frac{1}{5}$ to $1\frac{1}{3}$, length $2\frac{1}{10}$ to $2\frac{1}{8}$ in head from snout tip; teeth in narrow bands in jaws, biserial along sides of mandible; pair of canines in front of each jaw; narrow band of fine teeth on vomer and each palatine; interorbital $5\frac{1}{5}$ to $5\frac{2}{3}$, convex; hind preopercle edged denticulate, with 3 or 4 enlarged serrae at angle; opercular spines 3, median nearer lower, upper most advanced. Gill rakers 10+18, lanceolate, equal gill filaments or $1\frac{1}{2}$ in eye.

Scales 120 to 125 in lateral line to caudal base and 13 to 15 more on latter; tubes 70 to 72 in lateral line to caudal base and 5 more on latter; 22 to 25 scales above lateral line, 42 or 43 below, 60 to 66 predorsal, 30 to 33 rows on cheek; body scales with numerous small basal auxiliary scales; fine scales over most of fins basally; upper two-thirds of maxillary scaly. Scales with 3 to 5 basal radiating striae; 10 to 16 apical denticles, with 3 to 10 transverse series; circuli fine.

D. IX, 16, 1, third spine $2\frac{3}{4}$ to 3 in total head length, first branched ray $2\frac{2}{3}$ to 3; A. III, 8, 1, third spine $3\frac{3}{4}$ to 4, fourth ray $2\frac{1}{4}$ to $2\frac{1}{2}$; caudal $1\frac{3}{5}$ to $1\frac{2}{3}$, slightly emarginate behind; least depth of caudal peduncle $3\frac{1}{3}$ to $3\frac{2}{5}$; pectoral $1\frac{4}{5}$ to $1\frac{7}{8}$; ventral $1\frac{1}{8}$.

Pale grayish or lavender brown. Head and body finely and closely dotted all over with deeper or dusky brown, dots very close set and exceedingly numerous, not present on lower surface of head, chest, breast and belly. Iris yellowish. Fins all more or less dotted with darker, only pectoral paler terminally and ventral darker, terminally. Dorsals, anals and caudal with submarginal dusky shades and edges narrowly whitish on rayed fins.

Arabia, Zanzibar, Mozambique, Natal, Madagascar, Mauritius, Réunion, Bourbon, Rodriguez, India, Ceylon, Andamans, East Indies, Formosa, China, Queensland, Micronesia. Our materials are all like *Serranus hoedtii*.

6715, 6716. Manila market. December 4, 1908. Length 250 to 255 mm.

7084. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 390 mm.

SERRANUS AREOLATUS (Forskål)

Perca summana areolata FORSKÅL, Descript. Animal., 1775, pp. xi, 42.

Djedda, Red Sea.—GMELIN, Syst. Nat. Linn., vol. 1, 1789, p. 1317 (Arabia).

Perca areolata WALBAUM Artedi Pisc., vol. 3, 1792, p. 345 (on FORSKÅL).

Serranus areolatus KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 150 (Yokohama).

Serranus (Hyposerranus) areolatus KLUNZINGER, Fische Roth. Meer., 1884, p. 3 (Koscir).

Epinephelus areolatus COULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 202 (Red Sea, Aden, Muscat, Andamans, Malay Archipelago, Amboina).—

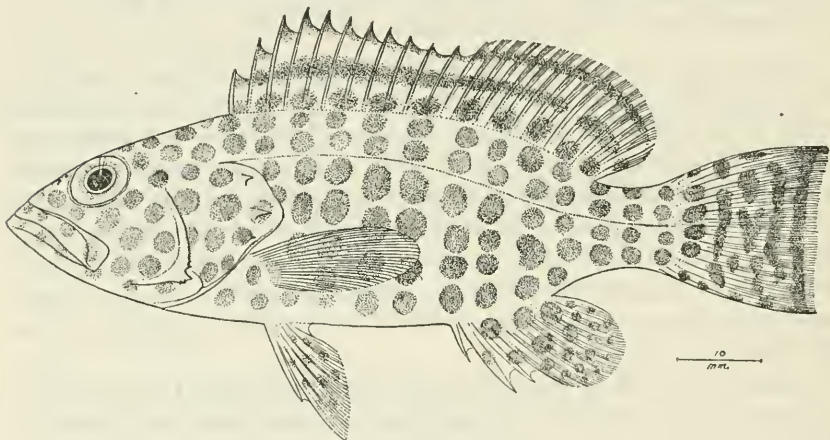


FIGURE 12.—*SERRANUS AREOLATUS* (FORSKÅL), YOUNG

JORDAN and SNYDER, Annot. Zool. Japon., vol. 3, 1901, p. 73 (Ohisham and Nagasaki).—SMITH and POPE, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 486 (Susaki and Yamagawa).—JORDAN and RICHARDSON, Proc. U. S. Nat. Mus., vol. 37, 1910, p. 448 (Sumatra).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 201 (Sulu).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 29 (Takao, Formosa).

Serranus (Epinephelus) areolatus ZUGMAYER, Abh. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 9 (Mekran and Oman).

Bodianus melanurus GEOFFROY ST. HILAIRE, Descript. Egypte, Poiss., 1809, p. 317, pl. 21, fig. 1. Suez.

Serranus melanurus ISADORE GEOFFROY ST. HILAIRE, Descript. Egypte, Poiss., vol. 1, pt. 1, 1827, p. 319.—VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 351 (Suez).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 147 (copied).

Serranus angularis VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 353. Ceylon.—DAY, Fishes of India, pt. 1, 1875, p. 22, pl. 5, fig. 2.—STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 47, pt. 1, 1883

p. 232 (Kagoshima Bay and Oshima).—BOULENGER, Proc. Zool. Soc. London, 1887, p. 654 (Muscat, Arabia).—DAY, Fauna Brit. India, vol. 1, 1889, p. 454.

Epinephelus angularis BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1876, p. 48 (Sumatra, Nias, Singapore, Banka, Java, Celebes, Sumbawa, Batjan, Amboina).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 71.

Serranus celebicus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 2, 1851, p. 217. Bulucumba, Celebes.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 139 (Amboina).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 676 (Koseir, Red Sea).—MARTENS, Preuss. Exp. Ost-Asien vol. 1, 1876, p. 386 (Larentuka, Flores).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 8 (Cebu; Kordo, Mysore).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 462 (Samar, Cebu; Nasugbu).

Serranus glaucus DAY, Proc. Zool. Soc. London, 1870, p. 678. Andamans.

Epinephelus craspedurus JORDAN and RICHARDSON, Proc. U. S. Nat. Mus., vol. 37, 1910, p. 447, fig. 7. Kagoshima, Japan.—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 13 (Kagoshima).—JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 235 (Toba).

Depth $2\frac{7}{8}$ to $3\frac{1}{8}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width 2 to $2\frac{1}{5}$. Snout $3\frac{3}{5}$ to 4 in head from snout tip; eye $4\frac{1}{6}$ to $4\frac{3}{5}$, $1\frac{1}{6}$ to $1\frac{1}{5}$ in snout, greater than interorbital; maxillary reaches $\frac{1}{2}$ to $\frac{3}{4}$ in eye, expansion $1\frac{4}{5}$ to 2, length $2\frac{1}{4}$ to $2\frac{1}{3}$ in head from snout tip; teeth in narrow bands in jaws, mandibulars largely biserial, but become uniserial behind; band of fine teeth on vomer and palatines; pair of small canines in front of each jaw, often double; interorbital $6\frac{1}{8}$ to $7\frac{1}{5}$ in head from snout tip; hind preopercle edge serrate, with two or three serrae enlarged at angle; median opercular spine little nearer lower and upper most advanced. Gill rakers 9 + 16, lanceolate, $2\frac{1}{8}$ in eye or much greater than gill filaments; seven above and four below rudimentary.

Scales 93 to 96 in lateral line to caudal base and 12 to 15 more on latter; tubes 46 to 51 in lateral line to caudal base and 2 or 3 more on latter; 19 or 20 scales above lateral line, 32 or 33 below, 60 to 70 predorsal, 30 or 31 rows across cheek to preopercle angle; body scales without minute basal auxiliary scales and fins all finely scaled basally; upper two-thirds of maxillary expansion scaly, with 12 transverse rows of scales. Scales with 5 or 6 basal radiating striae; 32 to 38 apical denticles, with 6 or 7 transverse series; circuli fine.

D. XI, 17, 1 or 16, 1, third spine $2\frac{1}{3}$ to $2\frac{3}{5}$ in total head length, first ray $2\frac{1}{3}$ to $2\frac{4}{5}$; A. III, 8, 1, third spine $3\frac{1}{8}$ to 4, third ray $2\frac{1}{3}$ to $2\frac{1}{5}$; caudal $1\frac{1}{2}$ to $1\frac{3}{5}$, emarginate behind, truncate in young; least depth of caudal peduncle 3 to $3\frac{2}{5}$; pectoral $1\frac{1}{2}$ to $1\frac{4}{5}$; ventral $1\frac{1}{5}$ to $1\frac{7}{8}$.

Gray brown generally, scarcely paler below. Body, head and fins all marked with numerous, large, rounded, close set darker blotches, in diameter about width of interspaces. With age hind caudal edge narrowly pale.

Red Sea, Arabia, Madagascar, India, Ceylon, Andamans, East Indies, Philippines, Formosa, Japan.

5426. Cebu market. April 7, 1908. Length 327 mm.

18672. Hinunangan Bay, Leyte Island. July 30, 1909. Length 112 mm. (1785).

5878. Malabang market, southern Mindanao. May 22, 1908. Length 310 mm.

4488 (D. 5164). Observation Island, S. 82° W., 8 miles (5° 01' 40" N., 119° 52' 20" E.), Sulu Archipelago, Tawi Tawi Group. In 18 fathoms. July 30, 1909. Length 112 mm.

2238 to 2240 (D. 5478). Tacbuc Point, S. 80° W., 15.2 miles (10° 46' 24" N., 125° 16' 30" E.), Leyte. In 57 fathoms. July 29, 1909. Length 150 to 223 mm. (1733 and 1734).

SERRANUS COROMANDELICUS Day

Serranus coromandelicus DAY, Fishes of India, pt. 4, 1878, p. 746 (on *Epinephelus dayi* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 47).—BOULENGER, Proc. Zool. Soc. London, 1887, p. 237 (Muscat, Arabia).—DAY, Fauna Brit. India, vol. 1, 1889, p. 445.

Serranus coromandelicus PEARSON, Rep. Gov. Marine Biol. Ceylon, 1912-13, pt. 4, p. E13 (between Chilaw and Colombo); 1914, pt. 4, p. E5 (Cheval Paar Group).

Serranus (Epinephelus) coromandelicus ZUGMAYER, Abh. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 9 (Oman).

Epinephelus coromandelicus BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 204 (type; Madras; Muscat).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 202 (Tual, Nidrig Kei).

Serranus longispinis (part) PLAYFAIR, Fishes of Zanzibar, 1866, p. 10.

Serranus waandersi (not BLEEKER 1873-76) DAY, Fishes of India, pt. 1, 1875, p. 12, pl. 8, fig. 1.

Epinephelus dayi (not BLEEKER 1873) BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 47 (on *Serranus waandersi*, not BLEEKER, DAY, 1875).

Epinephelus albimaculatus SEALE, Philippine Journ. Sci., vol. 4, No. 6, November, 1909, p. 509. Butuan Bay, Mindanao.

Epinephelus albimaculatus SEALE, Philippine Journ. Sci., vol. 4, No. 6, Nov., 1909, pl. 6.

Depth $3\frac{1}{5}$ to $3\frac{1}{3}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{2}$ to 3. Snout 4 to $4\frac{1}{3}$ in head from snout tip; eye $4\frac{3}{4}$ to 6, 1 to $1\frac{2}{5}$ in snout, equals interorbital with age, greater than interorbital in young; maxillary reaches three-fourths to well beyond eye with age, expansion $1\frac{1}{3}$ to $1\frac{2}{3}$ in eye, length $2\frac{1}{8}$ to $2\frac{1}{5}$ in head from snout tip; teeth in narrow bands in jaws, biserial along sides of mandible; pair of small canines in front of each jaw; band of small teeth on vomer and each palatine; interorbital $6\frac{1}{5}$ to $7\frac{1}{2}$, slightly convex; hind preopercle edge finely denticulate, with one or two large spines at angle; median opercular spine little nearer lower, upper advanced. Gill rakers 10 + 16, lanceolate, $1\frac{1}{8}$ in eye.

Scales 77 to 117 in lateral line to caudal base and 10 to 15? more on latter; pores 50 to 55 in lateral line to caudal base and 10 to 12 more on latter; 17 to 22 scales above lateral line, 30 to 31 below, 50 to 63 predorsal, 24 to 28 rows across cheek; body scales with minute

basal accessory scales; fine scales cover bases of fins; maxillary with upper half of expansion scaly, forming about 12 transverse rows. Scales with 4 or 5 basal radiating striae; 38 or 39 apical denticles with 10 transverse series; circuli very fine.

D. XI, 17, 1 or 18, 1, third spine $2\frac{3}{5}$ to $3\frac{1}{10}$ in total head length, first ray $2\frac{2}{5}$ to $3\frac{1}{5}$; A. III, 8, 1, third spine $2\frac{3}{4}$ to 4, third ray 2 to $2\frac{3}{5}$; caudal $1\frac{3}{5}$ to $1\frac{4}{5}$, convex behind; least depth of caudal peduncle $3\frac{2}{5}$ to $3\frac{3}{5}$; pectoral $1\frac{3}{5}$ to $1\frac{4}{5}$; ventral $1\frac{1}{8}$ to $2\frac{1}{5}$.

Brown, little paler on chest, breast and abdomen. Back, sides and head above covered with obscure slightly darker spots, smaller than eye. Dark or blackish line in groove of maxillary above. Young with six slightly inclined transverse darker bands, which extend on vertical fins. Vertical fins of young grayish, with obscure darker blotches.

Persian Gulf, India, Ceylon, East Indies, Philippines. The nominal *Epinephelus albimaculatus* Seale is evidently simply a color variant described as brownish tinged with green, about 30 rather large, scattered round yellow spots on head and fins slightly darker. The type was 280 mm. This name is preoccupied in *Serranus*.

7952. Batangas market. June 7, 1908. Length 195 mm.

21918. Cebu market. September 1, 1909. Length 77 mm. (1880).

5263. Dagupan, Luzon Island. March 19, 1908. Length 105 mm.

5703. Manila market. May 4, 1908. Length 294 mm.

12102. Manila market. June 11, 1908. Length 197 mm.

7759, 7760. Manila market. June 17, 1908. Length 157 to 172 mm.

19423. Sorsogon market. March 12, 1909. Length 128 mm.

4566, 21536, 21537. Subic Bay. January 7, 1908. Length 23 to 95 mm.

7819. Ulugan Bay, near mouth of Baheli River, Palawan. December 28, 1908.

Length 193 mm.

5062. Sandakan, Borneo. February 29, 1908, Length 235 mm.

20633. Kowloon market, China. September 26, 1908. Length 84 mm.

SERRANUS FARIO (Thunberg)

Perca fario THUNBERG, Kon. Vet. Acad. Nya. Handl., vol. 14, 1793, p. 296, pl. 9. Japan.

Holocentrus fario SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 323 (on THUNBERG).

Epinephelus fario JORDAN and RICHARDSON, Proc. U. S. Nat. Mus., vol. 37, 1910, p. 451, fig. 9 (Wakanoura; Nagasaki).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 413 (Misaki).—IZUKA and MATSUURA, Cat. Zool. Spec. Tokyo Mus., 1920, p. 153 (Kagoshima).—TANAKA, Figs. Descr. Fishes Japan, vol. 38, Sept. 1, 1927, p. 726, pl. 162, fig. 451 (Saiki).

Holocentrus maculatus BLOCH, Naturg. Auslând. Fische, vol. 4, pt. 7, 1790, p. 96, pl. 242, fig. 3. East Indies.—WALBAUM, Artedi Pisc., vol. 3, 1792, p. 646 (on BLOCH).—FORSTER, Fauna Indica, 1795, p. 16.—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 315 (East Indies).

Serranus maculatus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 11, 1856, p. 398 (Bouro).—DAY, Fishes of India, pt. 1, 1875, p. 14, pl. 2, fig. 4 (types of *Serranus gaimardi*); Fauna Brit. India, vol. 1, 1889, p. 447.—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 257 (Padang example); 1927, p. 275 (Orani; Philippines).

- Epinephelus maculatus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 50, pl. (8) 286, fig. 3, pl. (11) 289, fig. 2 (Java, Celebes, Manado, Ternate, Batjan, Buru, Amboina, Timor, New Guinea).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 211 (Zanzibar, Mauritius, Ceylon, Manado, Ponapé, Meduro).—JORDAN and SNYDER, Annot. Zool. Japon., vol. 3, 1901, p. 74 (southern Japan).—FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 524 (Padang).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 76 (San Fabian).—REGAN, Ann. Natal Mus., 1908, p. 244 (Kosi Bay).—GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol. 13, pt. 3, 1913, p. 67 (Natal).—FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines); Bishop Mus. Bull., No. 22, 1925, p. 9 (Guam).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 478 (Natal and Zululand coasts).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 177 (Fate, Guam, Samoa, New Guinea, Ebon Island).
- Holocentrus albofuscus* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 340, 384. East Indies.
- Serranus albofuscus* GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 108 (copied).
- Epinephelus albofuscus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (26) 304, fig. 2.—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 459 (Paragua).
- Epinephelus japonicus* KRUSENSTERN, Reisen, 1810, pl. 64, fig. 2. Japan.
- Serranus trimaculatus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 331 (on KRUSENSTERN).—SCHLEGEL, Fauna Japon., Poiss., pt. 1, 1842, p. 8 (Japan).—RICHARDSON, Ichth. China, Japan, 1846, p. 232 (Canton).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 109 (China, Japan, Cape of Good Hope).—PETERS, Monatsb. Akad. Wiss. Berlin, 1865, p. 110 (type).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 18 (Hong Kong; Java).—MARTENS, Preuss. Exp. Ost-Asien, vol. 1, 1876, p. 385 (Nagasaki Bay).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 459 (Samar).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 179 (compiled).
- Epinephelus trimaculatus* BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 221 (China).—JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 354 (Tokyo); Annot. Zool. Japon., vol. 3, 1901, p. 75 (Yokohama).
- Serranus ura* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 332. Japan.—RICHARDSON, Ichth. China, Japan, 1846, p. 231 (copied).
- Serranus quoyanus* VALENCIENNES, Hist. Nat. Poiss., vol. 6, 1830, p. 519. New Guinea.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 153 (Celebes).
- Serranus gaimardi* VALENCIENNES, Hist. Nat. Poiss., vol. 6, 1830, p. 520. New Guinea.—QUOY and GAIMARD, Voy. Astrolabe, Zool., vol. 3, 1834, p. 656, pl. 3, fig. 3 (Vanicoro; New Guinea).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 150 (copied).
- Epinephelus gaimardi* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (7) 285, fig. 1.
- Serranus ara* SCHLEGEL, Fauna Japon., Poiss., pt. 1, 1842, p. 8. Japan.
- Serranus sebae* BLEEKER, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. 488. Amboina.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 137 (China; Amboina).
- Serranus seba* ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 462 (Luzon, Manila).
- Serranus bontoides* BLEEKER, Nat. Tijds. Nederland. Indië, vol. 8, 1855, p. 405. Amboina.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 149 (copied).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 275 (Philippines); Mem. Bishop Mus., vol. 10, 1928, p. 178 (Ponapé, Carolines).

Epinephelus bontoides BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 873-716, p. 53, pl. (9) 287, fig. 2 (Bali, Celebes, Amboina, New Guinea).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 218 (Malay Archipelago; North Celebes).—SMITH and SEALE, Proc. Biol. Soc. Washington, vol. 19, June 4, 1906, p. 77 (Rio Grande, Mindanao).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 203 (Makassar).—FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines).

Plectropoma kulas THIOLLIÈRE, Fauna Woodlark, 1857, p. 145. Woodlark Island.

Serranus longispinis KNER, Reise Novara, Zool., vol. 1, No. 5, 1865, p. 275, pl. 2, fig. 5. Madras.—PLAYFAIR, Fishes of Zanzibar, 1866, p. 10 (Zanzibar).

Serranus medurensis GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 8, pl. 9, fig. A. Meduro and Marshall Islands.

Epinephelus diacanthus (not VALENCIENNES) JORDAN and SNYDER, Annot. Zool. Japon., vol. 3, 1901, p. 74 (Nagasaki and Yokohama).

Serranus matterni FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1918, p. 31, fig. 13. Philippines; 1927, p. 275 (type).

Depth $2\frac{7}{8}$ to $3\frac{1}{8}$; head $2\frac{2}{5}$ to $2\frac{3}{5}$, width $1\frac{7}{8}$ to $2\frac{2}{5}$. Snout $3\frac{3}{5}$ to $3\frac{7}{8}$ in head from snout tip; eye $6\frac{1}{3}$ to $6\frac{3}{5}$, $1\frac{1}{5}$ to $1\frac{4}{5}$ in snout, greater than interorbital in young to $1\frac{1}{5}$ in interorbital with age; maxillary reaches one-third in eye or till opposite hind eye edge, expansion $1\frac{1}{8}$ to $1\frac{1}{5}$ in eye, length $2\frac{1}{5}$ to $2\frac{1}{4}$ in head from snout tip; teeth fine, conic, in bands in jaws; outer maxillary row of teeth slightly enlarged, pair of small wide set front canines, often double and inner row of teeth depressible with inner anterior longest; mandibular teeth with pair of small front canines, often double, other teeth in three or four series anteriorly and becoming biserial laterally with inner row hinged; bands of small teeth on vomer and palatines, none on tongue; hind nostril little larger than front one though not over twice its size; interorbital $6\frac{1}{3}$ to $6\frac{2}{3}$ in head, little convex; hind preopercle edge minutely serrated, serrae little larger at angle; opercle with three spines, uppermost advanced and lower closer to median. Gill rakers 7 + 16, lanceolate, longer than gill filaments or $1\frac{3}{4}$ in eye; four upper and four lower rudimentary.

Scales 103 to 110 in lateral line to caudal base and 12 to 15? more on latter; tubes 50 or 51 in lateral line to caudal base and 3 or 4 more on latter; 20 to 24 scales above lateral line, 33 to 36 below, 76 to 80 predorsal forward nearly to snout tip, 40 to 50 rows obliquely across cheek to preopercle angle; most head and body scales with small crowded auxiliary basal scales; broad patch of scales on maxillary expansion, in 14 to 16 transverse rows. Scales with 6 basal radiating striae; 24 to 37 apical denticles, with 5 to 7 transverse series of basal elements; circuli moderate.

D. XI, 16, 1, third spine $2\frac{2}{3}$ to $2\frac{3}{4}$ in total head length, third ray $2\frac{2}{5}$ to $2\frac{7}{8}$; A. III, 8, 1, third spine $3\frac{3}{4}$ to $4\frac{1}{4}$, sixth ray $2\frac{1}{5}$ to $2\frac{1}{4}$; caudal $1\frac{2}{3}$ to $1\frac{3}{4}$, convexly rounded behind; least depth of caudal peduncle $3\frac{1}{5}$ to $3\frac{1}{4}$; pectoral $1\frac{3}{4}$ to 2; ventral $1\frac{4}{5}$ to $2\frac{1}{10}$.

Brown generally, slightly paler on breast and belly. Head, body, and fins everywhere with rounded dusky brown to blackish spots, rather large or equal in diameter to pale interspaces. Large examples with spots more numerous. Fins all shaded more or less darker than body color or with neutral tint. Iris brown.

Zanzibar, Zululand, Natal, Cape of Good Hope, Mauritius, Ceylon, India, Andamans, East Indies, Philippines, China, Japan, Melanesia, Micronesia. We admit the synonymy as given by Tanaka, with the exception of *Serranus corallicola* Valenciennes, *Serranus altiveloides* Bleeker, and *Serranus howlandi* Günther, which are placed with *Serranus corallicola* by Boulenger. The usually accepted *Holocentrus maculatus* Bloch is preoccupied in *Serranus* by *Perca maculata* Bloch, a synonym of the Atlantic *Trachinus adscensionis* Osbeck. The next available name would have been *Holocentrus albofuscus* Lacépède, though as shown by Jordan and Richardson is replaced by the earlier *Perca fario* Thunberg. As Bleeker pointed out, the most noteworthy character of this species is the graduated second, third, and fourth dorsal spines, which are much longer than the others. Of Bleeker's series of 12 examples he gives 276 mm. as the greatest length, though Boulenger gives 400 mm. Our materials all exceed these dimensions. The species is well figured by Günther as *Serranus medurensis*, though its dark spots on the breast, chest, and belly are like our small example, for they are much more numerous in the larger ones.

A815, A816. Galera Bay, Mindoro. October 27, 1909. Length 445 to 468 mm.

A799. Zamboanga market. October 9, 1909. Length 407 mm.

A843. Talisse Island, north of Celebes. November 9, 1909. Length 467 mm.

SERRANUS CHLOROSTIGMA Valenciennes

Serranus chlorostigma VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 352. Seychelles.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 151 (copied).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 463 (Luzon, Manila).

Epinephelus chlorostigma SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 73.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 203 (Red Sea, Masawah, Zanzibar, Seychelles, Muscat, China).—JORDAN and EVERMANN, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 341 (Formosa).—REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, 1905, p. 329 (Persian Gulf); Journ. Linn. Soc. London, vol. 12, ser. 2, 1907, p. 222 (Cargados Carajos, in 20 to 30 fathoms).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 71, pt. 1, 1907, p. 125 (Gischin, south Arabia).—JORDAN and RICHARDSON, Mem. Carnegie Mus., vol. 4, 1909, p. 183 (Takao, Keerun, Formosa); Proc. U. S. Nat. Mus., vol. 37, 1910, p. 446, fig. 6 (Misaki, Nagasaki, Wakanoura).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 413 (Kagoshima).—TANAKA, Figs. Descript. Fishes Japan, vol. 38, Sept. 1, 1927, p. 737, pl. 163, fig. 453 (Tanake, Japan).

Serranus (Epinephelus) chlorostigma ZUGMAYER, Abh. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 9 (Oman).

Serranus tauvina (not FORSKÅL) GEOFFROY ST. HILAIRE, Descript. Egypte, Poiss., 1809, p. 13, pl. 20, fig. 1.

Serranus arcolatus (not FORSKÅL) VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 350 (Red Sea).—PETERS, Arch. Naturg., 1855, p. 255 (Mozambique).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 149 (Red Sea).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 11 (Zanzibar); Proc. Zool. Soc. London, 1867, p. 848 (Seychelles).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 675 (Red Sea).—DAY, Fishes of India, pt. 1, 1875, p. 12, pl. 1, fig. 4; Suppl., 1888, p. 780; Fauna Brit. India, vol. 1, 1889, p. 445.

Epinephelus arcolatus SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 74. *Serranus waandersii* BLEEKER, Nat. Tijds. Nederland. Indië, vol. 17, 1858–59, p. 152. Boleling, Bali.

Serranus wandersi PEARSON, Rep. Marine Biol. Ceylon, 1912–13, pt. 4, p. E13 (Cheval Paar Group).

Epinephelus waandersii BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873–76, p. 47, pl. (3) 281, fig. 1 (Bali).

Serranus geoffroyi KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 675. Red Sea.—BOULENGER, Proc. Zool. Soc. London, 1887, p. 654 (Muscat, Arabia).

Serranus (Hyposerranus) geoffroyi KLUNZINGER, Fische Roth. Meer., 1884, p. 3.

Serranus celebicus var. *multipunctatus* KOSSMAN and RÄUBER, Zool. Ergebn. Reise Roth. Meer., 1877, p. 6. Red Sea.

Serranus assabensis GIGLIOLI, Ann. Mus. Civ. Stor. Nat. Genova, ser. 2, vol. 6, 1888, p. 68. Assain.

Depth $2\frac{7}{8}$; head $2\frac{2}{5}$, width 3. Snout $3\frac{2}{5}$ in head from snout tip; eye $7\frac{1}{2}$, $2\frac{1}{8}$ in snout, $1\frac{1}{4}$ in interorbital; maxillary reaches opposite eye center, expansion nearly equals eye, length $2\frac{1}{10}$ in head from snout tip; teeth very fine, in narrow bands in jaws, three or four series in front of mandible narrowing to two series laterally; pair of small canines in front of each jaw, some double; narrow band of fine teeth on vomer and each palatine; interorbital 6, convex; hind preopercle edge minutely dentate, two large serrae at angle; median opercular spine little near lower and upper most advanced. Gill rakers 10 + 21, lanceolate, greatly longer than gill filaments and slightly longer than eye.

Scales 104 in lateral line to caudal base and 10? more on latter; tubes 53 in lateral line to caudal base and 3 more on latter; 20 scales above lateral line, 33 below, 68 predorsal, 36 rows across cheek; body scales all with numerous, fine or small auxiliary basal scales; fins all more or less finely scaled basally; maxillary with upper half scaly, scales in 16 transverse rows.

D. XI, 17, 1, third spine $3\frac{1}{8}$ in total head length, first ray 3; A. III, 8, 1, third spine $4\frac{1}{5}$, fifth ray $1\frac{4}{5}$; caudal $1\frac{3}{5}$, slightly emarginate and truncate as expanded; least depth of caudal peduncle $3\frac{1}{8}$; pectoral 2; ventral $2\frac{1}{8}$.

Brown generally, marked with very numerous close set darker brown round spots. all greater than pale interspaces. All fins spotted like body.

Red Sea, Arabia, Persian Gulf, Zanzibar, Mozambique, Madagascar, Seychelles, India, Ceylon, East Indies, Philippines, Formosa, China, Japan. We admit this species following Boulenger who gives its maximum length as 630, which is greatly in excess of the closely related *Serranus areolatus* (Forskål). We have but one specimen.

932. Dodepo and Pasejogo Islands, Gulf of Tomini, Celebes, Dutch East Indies. November 16, 1909. Length 576 mm.

SERRANUS GILBERTI Richardson

Serranus gilberti RICHARDSON, Ann. Mag. Nat. Hist., vol. 9, 1842, p. 19, Near entrance to harbor of Port Essington; Ichth. China, Japan, 1846. p. 230 (China).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 148 (China, Australia, Port Essington).—KLUNZINGER, Sitz. Ber. Akad. Wiss. Wien, vol. 80, pt. 1, 1879, p. 334 (Port Denison, Queensland).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 150 (Singapore).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 462 (Paragua, Puerta Princesa).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 179 (Makemo, Mangareva, Funafuti, Apia, Apiang, Society Islands, Ascension Island, Ebon Island, Carolines, Kusaie, Ponapé).

Epinephelus gilberti BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 220 (Port Essington, Cape York, Madras, Zanzibar, Madagascar, Indian Ocean).—SEALE, Philippine Journ. Sci., vol. 9, 1914, p. 66 (Hong Kong).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 479 (Natal coast).

Perca melanosceldota GRAY, Cat. Fish. Gronow, 1854, p. 110. Indian Sea.

Serranus cylindricus GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 151. Madagascar.—PLAYFAIR, Fishes of Zanzibar, 1866, p. 11 (Zanzibar).—GÜNTHER, Cruise of Curaçoa, Brenchley, 1873, p. 414, pl. 28, fig. A (Indian Ocean).—PETERS, Monatsb. Akad. Wiss. Berlin, 1878, p. 435 (Mauritius).

Epinephelus cylindricus BLEEKER, Nat. Tijds. Dierk., vol. 1, 1863, p. 344 (Madagascar).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 75, pl. 8, fig. 1.

Serranus carinatus ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 265, pl. 4, fig. 3. Cape Grenville, Queensland.

Depth $3\frac{1}{4}$; head $2\frac{1}{3}$, width 2. Snout 4 in head from snout tip; eye $5\frac{3}{4}$, $1\frac{1}{5}$? in snout, greater than interorbital; maxillary reaches three-fourths in eye, expansion $1\frac{3}{5}$ in eye, length $2\frac{1}{5}$ in head from snout tip; teeth in narrow bands in jaws, biserial along sides of mandible; pair of small canines in front of each jaw; band of small teeth on vomer and each palatine; interorbital 7, nearly level; hind preopercle edge with very minute and feeble serrae; median opercular spine closer to lower and upper advanced. Gill rakers 8 + 16, lanceolate, longer than gill filaments or $1\frac{1}{5}$ in eye.

Scales 85 in lateral line to caudal base and 11 more on latter; tubes 48 in lateral line to caudal base and 4 more on latter; 16 scales above lateral line, 32 below, 57 predorsal, 30 rows across cheek to preopercle angle; most body scales with crowded, minute, numerous, fine, basal scales; some scales on flanks ctenoid, others smooth; fins all finely

scaled basally; upper half of maxillary expansion finely scaly. Scales with 5 to 7 basal radiating striae; circuli fine.

D. IX, 16, 1, third spine $3\frac{1}{2}$ in total head length, first ray $3\frac{1}{5}$; A. III, 8, 1, third spine $4\frac{1}{4}$, third ray $2\frac{3}{5}$; caudal 2, convex behind; least depth of caudal peduncle $3\frac{4}{5}$; pectoral 2; ventral $2\frac{2}{5}$.

Pale drab generally, head, body and fins all with close set large darker rounded spots, most at least large as pupil, some blackish and others paler. Iris yellowish. Caudal with narrow pale edge posteriorly. Pectoral dusky terminally and dark spots small.

Zanzibar, Natal, Madagascar, Mauritius, India, East Indies, Philippines, China, Queensland. We have a single example. The rounded snout, cycloid scales and coloration appear to be diagnostic.

A1193. Doworra Island, south of Patientie Strait. December 2, 1909. Length 350 mm.

SERRANUS MEGACHIR Richardson

Serranus megachir RICHARDSON, Ichth. China, Japan, 1846, p. 230, China.—MACLEAY, Proc. Linn. Soc. New South Wales, vol. 5, 1881, p. 319 (Torres Straits, Queensland).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 257 (Padang material); Mem. Bishop Mus., vol. 10, 1928, p. 179 (copied), *Epinephelus megachir* BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 219 (Philippines, China, China Sea, Siam, Celebes, Mysol, Amboina, Louisiades).—FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 524 (Padang).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 20 (Cavite).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 256 (Calayan); Proc. U. S. Nat. Mus., vol. 37, 1910, p. 448, fig. 8 (Keerun, Formosa).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 498 (Okinawa).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 203 (Makassar and Saleyer).—JORDAN and RICHARDSON, Mem. Carnegie Mus., vol. 6, No. 4, 1914, p. 249, fig. 22 (Misaki).

Serranus areolatus japonicus (not *Epinephelus japonicus* KRUSENSTERN 1810) SCHLEGEL, Fauna Japon., Poiss., pt. 1, 1842, p. 8. Japan.

Serranus gilberti (part) RICHARDSON, Ichth. China, Japan, 1846, p. 230 (China).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 148 (China, Amboyna); Cruise of Curaçoa, Brechley, 1873, p. 410 (Misol, Moluccas).—ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 263 (Trinity Bay to Cape York, Queensland).—DAY, Fishes of India, pt. 4, 1878, p. 746 (note); Fauna Brit. India, vol. 1, 1889, p. 446.

Epinephelus gilberti BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 56 (Sumatra, Nias, Signapore, Banka, Biliton, Duizend Islands, Java, Celebes, Sumbawa, Flores, Timor, Buru, Ceram, Amboina, Banda, Waigiu); vol. 8, 1876-77, pl. (53) 331, fig. 3.

Serranus pardalis BLEEKER, Journ. Indian Arch., vol. 2, 1848, p. 635. Bima, Sumbawa, Batavia.

Serranus quoyanus (not VALENCIENNES) GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1858, p. 153 (Amboina).

Serranus hexagonatus (part) KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 683.

Serranus merra (not BLOCH) DAY, Fishes of India, pt. 1, 1875, p. 13, pl. 2, fig. 2.

Serranus alatus ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 264, pl. 4, fig. 2. Hall Sound, New Guinea.

Depth $2\frac{3}{4}$ to $3\frac{1}{10}$; head $2\frac{1}{3}$ to $2\frac{1}{2}$, width 2 to $2\frac{1}{3}$. Snout $4\frac{1}{8}$ to 5 in head from snout tip; eye 4 to 5, 1 to $1\frac{1}{3}$ in snout, greater than interorbital; maxillary reaches below hind eye edge in young and nearly half an eye diameter beyond with age, expansion $1\frac{1}{2}$ to 2 in eye, length $2\frac{1}{10}$ to $2\frac{1}{3}$ in head from snout tip; teeth pointed, conic, in narrow bands above with outer row little enlarged and two rows of mandibular teeth; canines as double pair in front of each jaw; vomer and palatines with small teeth; interorbital $6\frac{3}{5}$ to 8, slightly elevated; hind preopercle edge finely serrated above, serrae coarser below; median opercular spine large, behind and near lower, uppermost spine obsolete and anterior. Gill rakers 7+15, equal gill filaments, or two-fifths of eye; four above and 5 below rudimentary.

Scales 86 to 88 in lateral line to caudal base and 12 to 15 more on latter; tubes 48 to 51 in lateral line to caudal base and 5 or 6 more on latter; 12 or 13 scales above lateral line, 24 to 33 below, 48 to 60

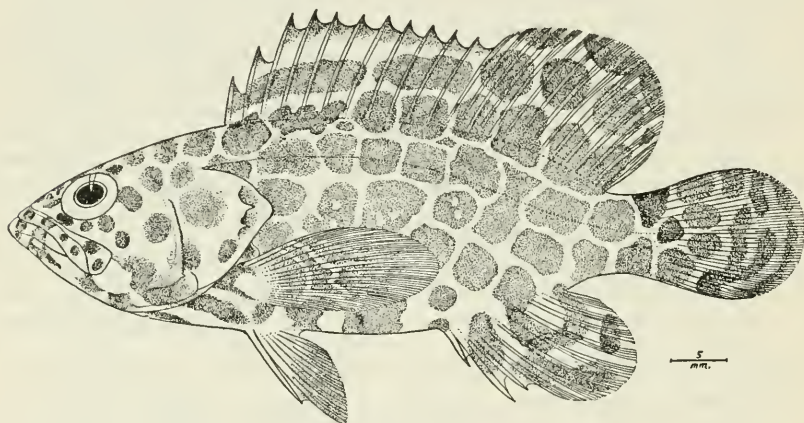


FIGURE 13.—*SERRANUS MEGACHIR* (RICHARDSON), YOUNG

predorsal, about 24 rows across cheek to preopercle angle; very small scales on top of head and predorsal, not as auxiliary fine basal body scales; fins all more or less covered with fine basal scales; maxillary naked or upper half of expansion finely scaled.

D. XI, 17, fifth spine $2\frac{4}{5}$ to $3\frac{1}{2}$ in total head length, fifth ray 2 to $2\frac{1}{2}$; A. III, 8, third spine $2\frac{7}{8}$ to $3\frac{2}{5}$, sixth ray 2 to $2\frac{1}{5}$; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, rounded; least depth of caudal peduncle $3\frac{1}{3}$ to $3\frac{3}{5}$; pectoral $1\frac{1}{10}$ to $1\frac{1}{5}$; ventral $1\frac{3}{5}$ to 2.

Pale brown covered with more or less large rich blackish brown and rather large spots, nearly uniform in size, largely rounded except on head. Often certain blotches may be conspicuously darker or appear more emphasized than others. Young with fewer dark blotches. Reticulated pale brown spaces separating spots on back and sides becoming whitish on lower surface of body, often lines narrow and leave dark blotches of back variously defined hexagonally

or otherwise. On mandible, lower surface of head and belly, large or broad cross bands of dull rosy brown. Marginal portions of vertical fins sometimes little dusky, on anal grayish or dusky slate like greater portions of paired fins terminally. In young paired fins pale with large dusky gray blotches.

India, Siam, East Indies, Philippines, Formosa, Riu Kiu, China, Japan, Queensland, Melanesia. Boulenger gives the length as 350 mm., much greater than any of our specimens. It may usually be known by its long pectorals and large spots.

16656. Canimo Island near Daet, east coast of Luzon. June 15, 1909. Length 172 mm.

5493, 5494, 15879. Catbalogan, Samar Island. April 14, 1908. Length 184 to 259 mm.

9331 to 9333. Catbalogan. April 15, 1908. Length 96 to 190 mm.

5530, 6711. Catbalogan. April 16, 1908. Length 120 to 244 mm.

15489. Cebu market. March 26, 1909. Length 228 mm. (1484).

8858. Daet beach, Canimo Island, east coast of Luzon. June 15, 1909. Length 266 mm.

6102, 6952, 6955. Iloilo market, Iloilo, Panay Island. May 31, 1908. Length 122 to 225 mm.

11767, 11768. Iloilo market. June 2, 1908. Length 195 to 206 mm.

5212. Manila market. June 11, 1908. Length 134 mm.

17936. Manila market. June 13, 1908. Length 197 mm.

19618. Mansalay, Mindoro Island. June 4, 1908. Length 73 mm.

12757. North end of Endeavor Strait, northwest coast of Palawan Island. December 22, 1908. Length 111 mm.

6612. Northwest point Verde Island, vicinity southern Luzon. July 22, 1908. Length 230 mm.

5941. Zamboanga market. May 26, 1908. Length 243 mm.

One example. Great Tobea Island. December 15, 1909. Length 32 mm.

6698. Kowloon market, China. September 18, 1908. Length 272 mm.

11666. Kowloon market. October 5, 1908. Length 123 mm.

SERRANUS FASCIATOMACULATUS Peters

Serranus fasciatomaculatus PETERS, Monatsb. Akad. Wiss. Berlin, 1865, p. 111 (on 2 examples said to be reported in Bleeker's fourth contribution to Japan, p. 8).

Depth $3\frac{1}{8}$ to $3\frac{1}{4}$; head $2\frac{1}{2}$ to $2\frac{3}{5}$, width $2\frac{1}{5}$ to $2\frac{2}{5}$. Snout $4\frac{1}{4}$ to $4\frac{4}{5}$ in head; eye $4\frac{1}{4}$ to $4\frac{1}{2}$, subequal with snout, greater than interorbital; maxillary reaches opposite hind eye edge, to hind pupil edge in young, expansion $1\frac{4}{5}$ to 2 in eye, length $2\frac{1}{8}$ to $2\frac{1}{6}$ in head; teeth fine, in rather narrow bands in jaws, biserial along sides of mandible with inner row longer and depressible; pair of small canines in front of each jaw, often double; narrow bands of fine teeth on vomer and palatines; interorbital $7\frac{1}{4}$ to $8\frac{1}{5}$, nearly level; hind preopercle edge denticulate, with enlarged serrae little above angle; opercular spines 3, equidistant, upper little advanced. Gill rakers 8+14, lanceolate, $1\frac{1}{2}$ in gill filaments, which one-half of eye; five above and five below rudimentary.

Scales 98 in lateral line to caudal base and 15 more on latter; tubes 47 in lateral line to caudal base and 10 more on latter; 18 scales above lateral line, 25 below, 52 predorsal, 24 rows across cheek to preopercle angle at edge; body scales without small, basal, auxiliary scales; maxillary scaleless. Scales with 4 to 7 basal radiating striae; 28 to 34 apical denticles, in 4 to 6 transverse rows; circuli moderate.

D. XI, 16, 1, or 17, 1, third spine $2\frac{2}{5}$ to $2\frac{3}{4}$ in total head length, third ray 2 to $2\frac{1}{4}$; A. III, 8, 1, second spine $2\frac{3}{4}$ to 3, third ray $1\frac{7}{8}$ to $2\frac{1}{4}$; caudal $1\frac{1}{2}$ to $1\frac{2}{3}$, convex behind; least depth of caudal peduncle $3\frac{4}{5}$ to $3\frac{7}{8}$; pectoral $1\frac{2}{5}$ to $1\frac{2}{3}$; ventral $1\frac{7}{8}$ to $2\frac{1}{5}$.

Brown, usually with five or six darker cross bands wide as interspaces, often more or less inclined and sometimes paired or last two or three often dividing below, and may form six inferior narrow bands, some of which may extend on base of anal fin. Dark bands also reflected on dorsal fins. Body often covered with dark spots, often forming waved streaks on tail below which may be more or less broken; spots on back nearly always more numerous. Belly, breast and lower surface of head pale to whitish and immaculate. Iris olive. Vertical fins brownish, colored with dark brown, gray and dull olive, often producing a mottled appearance. Paired fins brownish. Ventral darker terminally.

We differ from Boulenger in separating this species from *Serranus diacanthus* Valenciennes. It appears to differ in the arrangement of the dark transverse bands, which are inclined instead of vertical; the body is mottled and spotted as well as banded and the pectorals are light instead of black or blackish. *S. diacanthus*, as figured by Day, has two strong spines at the preopercle angle. In some examples of the present species the spines at the preopercle angle are enlarged, three or more, but not two. We have no examples of *S. diacanthus* from the Philippines though both species were secured in the Hong Kong markets.

7589, 15880. Catbalogan, Samar Island. April 14, 1908. Length 185 to 193 mm.

13007. Catbalogan. April 15, 1908. Length 135 mm.

12833. Cavite and San Roque markets. June 27, 1908. Length 116 mm.

5995. Cavite market. December 1, 1908. Length 105 mm.

21918. Cebu market. September 1, 1909. Length 80 mm.

3253. Corregidor Light, Manila Bay. June 11, 1908. Length 157 mm.

13981. Iloilo market, Panay Island. May 31, 1908. Length 141 mm.

11769. Iloilo market. June 2, 1908. Length 150 mm.

5213, 12101. Manila market. June 11, 1908. Length 179 to 196 mm.

7758. Manila market. June 17, 1908. Length 179 mm.

20243. San Roque market, Cavite. June 13, 1908. Length 100 mm.

9967. Kowloon market, China. September 18, 1908. Length 153 mm.

SERRANUS DIACANTHUS Valenciennes

Serranus diacanthus VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 319.

Malabar.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 110 (Bengal,

- China, Hong Kong, India).—KNER, *Reise Novara*, Zool., vol. 1, pt. 5, 1865, p. 20 (Hong Kong).—DAY, *Fishes of India*, pt. 1, 1875, p. 17, pl. 3, fig. 4 (Kurrachee).—MARTENS, *Preuss. Exp. Ost-Asien*, vol. 1, 1876, p. 385 (Formosa Strait; Nagasaki Bay).—GÜNTHER, *Rep. Voy. Challenger*, vol. 1, 1880, p. 55 (Hong Kong).—KÁROLI, *Termesz. Füzetek*, Budapest, vol. 5, 1882, p. 149 (Yokohama).—DAY, *Fauna Brit. India*, vol. 1, 1889, p. 449.—BOULENGER, *Proc. Zool. Soc. London*, 1889, p. 237 (Muscat, Arabia).—THURSTON, *Notes Pearl Fisher. Manaar*, 1890, p. 91 (Pamban).—ELERA, *Cat. Fauna Filip.* vol. 1, 1895, p. 460 (Luzon Currimao, Ilocos).—FOWLER, *Proc. Acad. Nat. Sci. Philadelphia*, 1925, p. 222 (Natal); *Bishop Mus. Bull.*, No. 38, 1927, p. 13 (Jarvis Island, Polynesia); *Mem. Bishop Mus.*, vol. 10, 1928, p. 177 (compiled).
- Serranus (Epinephelus) diacanthus* ZUGMAYER, *Abh. Bayer. Akad. Wiss., Math.-Phys. Kl.*, vol. 26, pt. 6, 1913, p. 10 (Mekran and Oman).
- Epinephelus diacanthus* BOULENGER, *Cat. Fish. Brit. Mus.*, vol. 1, 1895, p. 209 (Muscat, Bombay, Madras, India, Hong Kong, Amoy, Formosa, Shanghai, China).—JORDAN and EVERMANN, *Proc. U. S. Nat. Mus.*, vol. 25, 1902, p. 341 (Formosa).—PELLEGRIN, *Bull. Soc. Zool. France*, vol. 30,

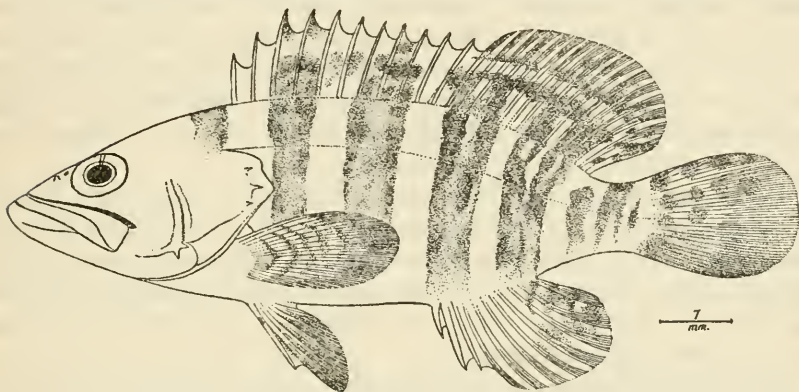


FIGURE 14.—*SERRANUS DIACANTHUS* VALENCIENNES, YOUNG

- 1905, p. 85 (Tonkin).—JORDAN and SEALE, *Bull. Bur. Fisher.*, vol. 26, 1906 (1907), p. 19 (Cavite).—JORDAN and RICHARDSON, *Bull. Bur. Fisher.*, vol. 27, 1907 (1908), p. 256 (Cuyo and Cagayancillo).—WEBER, *Siboga Exp.*, vol. 57, *Fische*, 1913, p. 202 (Bara Bay, Buru Island).—PELLEGRIN, *Bull. Soc. Zool. France*, vol. 39, 1914, p. 224 (Fort Dauphin, Madagascar).—BARNARD, *Ann. South Afric. Mus.*, vol. 21, 1928, p. 478 (Natal coast).
- Serranus nebulosus* (not VALENCIENNES) RICHARDSON, *Ichth. China, Japan*, 1846, p. 232 (Canton).
- Serranus trimaculatus* (not VALENCIENNES) BLEEKER, *Act. Soc. Sci. Ind. Néerland.*, vol. 3, No. 9, 1858, p. 8.
- Serranus sexfasciatus* (not VALENCIENNES) GÜNTHER, *Cat. Fish. Brit. Mus.*, vol. 1, 1859, p. 108 (East Indies).
- Serranus faciatomaculosus* MARTENS, *Preuss. Exp. Ost-Asien*, vol. 1, 1876, p. 386 (Nagasaki Bay) (lapsus for *Serranus fasciatomaculatus* PETERS).
- Epinephelus dayi* BLEEKER, *Verh. Akad. Wet. Amsterdam*, vol. 14, No. 2, 1873, p. 105.
- ?*Serranus salmonoides* KOSSMANN and RAÜBER, *Ergebn. Reise Roth. Meer.*, 1877, p. 7.

Depth $3\frac{1}{6}$ to $3\frac{2}{5}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{4}$ to $2\frac{2}{5}$. Snout $3\frac{3}{5}$ to $4\frac{1}{5}$ in head from snout tip; eye $4\frac{2}{3}$ to $5\frac{1}{2}$, $1\frac{1}{6}$ to $1\frac{1}{4}$ in snout, greater than interorbital; maxillary reaches $\frac{2}{3}$ to $\frac{4}{5}$ in eye, expansion $1\frac{3}{5}$ to 2 in eye, length $2\frac{1}{5}$ to $2\frac{1}{4}$ in head from snout tip; teeth in narrow bands in jaws, biserial on sides of mandible; pair of small canines in front of each jaw; band of small teeth on vomer and each palatine; interorbital $6\frac{1}{2}$ to $7\frac{1}{2}$, slightly convex; hind preopercle edge denticulate and two enlarged serrae at angle; median opercular spine nearer lower and upper advanced. Gill rakers 8+16, little longer than gill filaments or $1\frac{3}{4}$ in eye.

Scales 85 to 98 in lateral line to caudal base and 8 to 10 more on latter; pores 52 to 54 in lateral line to caudal base and 5 more on latter; 17 or 18 scales above lateral line, 33 to 36 below, 56 to 60 predorsal, 21 to 25 rows across cheek; fin bases all more or less finely scaled; body scales without basal auxiliary small scales except on head; maxillary scaleless. Scales with 5 or 6 basal radiating striae; 28 to 30 apical denticles, with 4 to 8 transverse series; circuli fine.

D. XI, 15, 1 or 16, 1, third spine $2\frac{2}{3}$ to 3 in total head length, first ray $2\frac{4}{5}$ to 3; A. III, 7, 1, third spine $3\frac{2}{3}$ to $4\frac{1}{5}$, third ray $2\frac{1}{5}$ to $2\frac{1}{4}$; caudal $1\frac{2}{3}$ to $1\frac{4}{5}$, convex behind; least depth of caudal peduncle $3\frac{3}{4}$ to $3\frac{4}{5}$; pectoral $1\frac{3}{4}$ to $1\frac{4}{5}$; ventral 2 to $2\frac{3}{5}$.

Brown, sometimes with obscure darker spots. Six dark brown broad vertical bands, usually as pair on trunk and pair at soft dorsal and anal. Often dark vertical bands may be imperfectly divided. Iris slaty. Though fins unspotted, clouded with darker and dark vertical bands extend on dorsals. Young with paired fins and anal more or less dusky.

Arabia, Natal, Madagascar, India, East Indies, Philippines, China, Formosa, Japan, Polynesia. This species is close to *Serranus awoara* from Formosa and Japan.

18854. Hong Kong market. October 19, 1908. Length 177 mm.

6801. Kowloon market. September 18, 1909. Length 191 mm.

6827. Kowloon market. October 17, 1909. Length 253 mm.

11665. Kowloon market. October 5, 1908. Length 125 mm.

SERRANUS BRUNNEUS (Bloch)

Epinephelus bruneus BLOCH, Naturg. Ausländ. Fische, vol 7, 1793, p. 15, pl. 328, fig. 2. "Norway".—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 300 (Japan).

Epinephelus brunneus BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 213 (Canton).

Serranus brunneus GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 107 (China).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 18 (Madras).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 459 (Luzon, Cagayan).

Serranus kawamebari (not SCHLEGEL), RICHARDSON, Ichth. China, Japan, 1846, p. 234 (Canton).

Depth $3\frac{1}{2}$ to $3\frac{3}{5}$; head $2\frac{1}{4}$ to $2\frac{2}{5}$, width $2\frac{1}{5}$ to $2\frac{4}{5}$. Snout $4\frac{3}{4}$ to $4\frac{4}{5}$ in head from snout tip; eye 5 to $5\frac{1}{2}$, 1 to $1\frac{1}{4}$ in snout, greater than interorbital; maxillary reaches opposite hind eye edge or little beyond, expansion $1\frac{2}{3}$ to $1\frac{3}{4}$ in eye, length $2\frac{1}{8}$ to $2\frac{1}{5}$ in head from snout tip; teeth in narrow bands in jaws, biserial on sides of mandible; pair of canines in front of each jaw; band of fine teeth across vomer and each palatine; interorbital $6\frac{1}{4}$ to $7\frac{1}{3}$, very slightly convex; hind preopercle edge minutely serrate and three large spines at angle; median opercle spine nearer lower and upper advanced. Gill rakers 9 + 16, lanceolate, equal gill filaments or half of eye.

Scales 85 to 90 in lateral line to caudal base and 8 to 10 more on latter; pores 57 to 67 in lateral line to caudal base and 8 to 10 more on latter; 15 to 18 scales above lateral line, 26 to 29 below, 48 to 50 predorsal, 23 to 26 rows on cheek; body scales without fine basal auxiliary scales; fine scales over fins basally; upper half of maxillary expansion with patch of fine scales. Scales with 5 basal radiating striae; circuli moderate.

D. XI, 13, 1 or 14, 1, third spine $2\frac{7}{8}$ to $3\frac{1}{10}$ in total head length, third ray $2\frac{1}{3}$ to $2\frac{1}{2}$; A. III, 8, 1, third spine $3\frac{1}{4}$ to $3\frac{1}{2}$, third ray $2\frac{1}{8}$ to $2\frac{1}{4}$; caudal $1\frac{2}{3}$ to $1\frac{3}{4}$, convex behind; least depth of caudal peduncle $3\frac{2}{3}$ to 4; pectoral $1\frac{3}{4}$ to $1\frac{4}{5}$; ventral $2\frac{1}{8}$ to $2\frac{1}{5}$.

Brown, lighter below. Six transverse oblique cross bands, slightly darker and more or less with short streaks, bars and spots below lateral line. Oblique dark streaks from eye over postocular and cheek, variably broken. Fins all pale, verticals and ventrals darker or grayish terminally.

Chinese Sea. Reported from the Philippines by Elera.

9745, 11664. Kowloon market, China. October 5, 1908. Length 130 to 159 mm.

6828. Kowloon market. October 17, 1909. Length 171 mm.

SERRANUS SEXFASCIATUS Valenciennes

Serranus sexfasciatus (KUHL and VAN HASSELT) VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 360. Java.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 108 (East Indies).—DAY, Fishes of India, pt. 1, 1875, p. 17 (Japan; type).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 149 (Singapore; Canton, China).—DAY, Fauna Brit. India, vol. 1, 1889, p. 449.—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 257 (Padang material); Mem. Bishop Mus., vol. 10, 1928, p. 178 (compiled). *Epinephelus sexfasciatus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 60, pl. (3) 281, fig. 2 (Sumatra, Singapore, Java, Celebes).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 214 (Philippines, Arafura Sea, Louisiades).—STEINDACHNER, Anz. Akad. Wiss. Wien, vol. 39, No. 24, Nov. 20, 1902, p. 316 (Kischin).—FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 524 (Padang).—REGAN, Journ. Linn. Soc. London, ser. 2, vol. 12, 1907, p. 222 (Haddumati, Maldives, in 35 fathoms).—SEALE, Philippine Journ. Sci., vol. 5, No. 4, 1910, p.

275 (Sandakan, Borneo).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 205 (Saleyer).

Serranus diacanthus (part) GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 110 (Lousiades).

Depth $2\frac{4}{5}$ to $3\frac{1}{6}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width 2 to $2\frac{1}{2}$. Snout $4\frac{1}{4}$ to $4\frac{2}{3}$ in head from snout tip; eye $3\frac{3}{4}$ to $4\frac{2}{3}$, subequal with snout to greater in young, greater than interorbital; maxillary reaches three-fourths in eye in young, beyond eye with age, expansion $1\frac{1}{3}$ to $1\frac{7}{8}$ in eye, length 2 to $2\frac{1}{5}$ in head from snout tip; teeth in narrow bands, pointed, outer row erect and one or more rows of inner depressible, biserial on sides of mandible; pair of front canines in each jaw, often double; small patch of fine teeth on vomer and palatines; interorbital 7 to $7\frac{2}{5}$, little convex; preopercle edge finely denticulate, ends in two strong spines below; opercular spines 3, upper anterior and obsolete. Gill rakers 7+13 or 14, little less than gill filaments, which two-fifths of eye; upper five rudimentary.

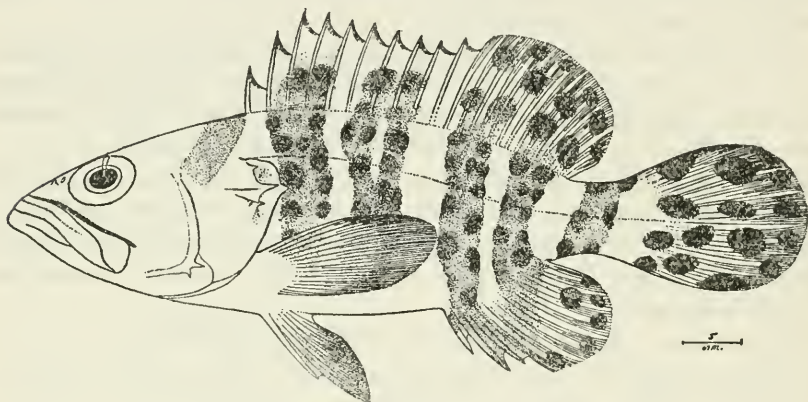


FIGURE 15.—*SERRANUS SEXFASCIATUS* VALENCIENNES, YOUNG

Scales 73 to 75 in lateral line to caudal base and 10 to 12 more on latter; tubes 44 to 49 in lateral line to caudal base and 4 or 5 more on latter; 16 to 18 scales above lateral line, 25 to 28 below, 44 to 48 predorsal, 17 to 19 rows across cheek; body scales without small basal accessory scales; fins more or less minutely scaled basally; scales mostly very small and smooth on head, larger on cheek and opercle, lips and maxillary naked. Scales with 5 basal radiating striae; 17 to 25 apical denticles in 4 or 5 transverse series; circuli moderate.

D. XI, 15, 1, third spine $2\frac{1}{10}$ to $2\frac{2}{3}$ in total head length, seventh ray $2\frac{1}{10}$ to $2\frac{1}{2}$; A. III, 8, 1, second spine $2\frac{1}{2}$ to $3\frac{1}{5}$, fourth ray 2 to $2\frac{1}{2}$; caudal $1\frac{2}{5}$ to $1\frac{2}{3}$, convex behind; least depth of caudal peduncle $3\frac{1}{8}$ to $3\frac{2}{5}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{1}{5}$ to $1\frac{7}{8}$.

Brown, pale or whitish on lower surface of head and abdomen. Sides marked with six broad deep brown vertical bands and indistinct light brown blotches scattered about and mixed with few darker ones.

Iris yellowish. Paired fins grayish and margins more or less blotched or spotted with brownish.

Kischin, Maldives, India, East Indies, Philippines, China, Melanesia. Known chiefly by the large strong spines at the preopercle angle. The coloration of the body is with six dark transverse bands all marked with yellowish spots. The vertical fins are marked with large, contrasted, rounded black spots. According to Boulenger reaches 230 mm.

12832. Cavite and San Roque markets. June 27, 1908. Length 82 mm.

3252, 4066 to 4068 (D. 5360). Corregidor Light, N. 74° W., 6.9 miles (14° 21' N., 120° 41' E.), Manila Bay. February 8, 1909. Length 62 to 83 mm.

4201 (D. 5361). Corregidor Light, S. 89° W., 7.2 miles (14° 24' 15" N., 120° 41' 30" E.), Manila Bay. February 8, 1909. Length 90 mm.

22469. Manila market. May 2, 1908. Length 103 mm.

21209. Manila market. December 4, 1908. Length 91 mm.

SERRANUS FASCIATUS (Forskål)

Perca fasciata FORSKÅL, Descript. Animal., 1775, pp. 11, 40. Red Sea at Cape Mohammed.—HOUTTUYN, Naturk. Verh. Holland. Maatsch. Haarlem, vol. 20, 1782, p. 326 (Japan).—BONNATERRE, Tabl. Ichth., 1788, p. 131 (Red Sea).—GMELIN, Syst. Nat. Linn., vol. 1, 1789, p. 1316 (Red Sea).—WALBAUM, Artedi Pisc., vol. 3, 1792, p. 346 (on FORSKÅL).

Serranus fasciatus KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 681 (Koseir, Red Sea).—GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 6, pl. 6 (Red Sea; East Africa; Indian Ocean; China; North Australia; Society Islands; Tuamotus).—DAY, Fishes of India, vol. 1, 1875, p. 15, pl. 3, fig. 2 (Andaman Islands).—KLUNZINGER, Fische Roth. Meer., 1884, p. 6.—DAY, Fauna Brit. India, vol. 1, 1889, p. 449.—THURSTON, Notes Pearl Fisher. Manaar, 1890, p. 91 (Pamban).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 223 (Natal).—FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925, p. 14 (Wake Island).—FOWLER, Bishop Mus. Bull., No. 38, 1927, p. 13 (Jarvis Island); Mem. Bishop Mus., vol. 10, 1928, p. 176 (Mangareva, Faté, Nukuhiva, Palmyra, Wake Island, type of *Epinephelus zaphyrus* SEALE, Tuamotus, Tahiti, Tempe).

Serranus (Epinephelus) fasciatus ZUGMAYER, Abh. Bayer. Akad. Wiss., Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 10 (Mekran and Oman).

Epinephelus fasciatus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 66 (Sumatra, Java, Celebes, Sangi, Sumbawa, Flores, Timor, Ternate, Batjan, Amboina); vol. 8, 1876-77, pl. (48) 326, fig. 3; Verh. Akad. Wet. Amsterdam, vol. 18, No. 3, 1879, p. 1 (Mauritius).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 78.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 238 (Cebu, Red Sea, Zanzibar, Seychelles, Singapore, China, Riu Kiu, Japan, Amboina, Copang, Louisiades, Bonham Island, Darnley Island, Tahiti?).—JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, p. 354 (Tokyo); Annot. Zool. Japon., vol. 3, 1901, p. 74 (Nagasaki, Shimoda, Yokohama, Kochi).—REGAN, Journ. Linn. Soc. London, vol. 12, ser. 2, 1907, p. 222 (Coetivy, Seychelles Group).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 71, pt. 1, 1907, p. 127 (Bal Hâf, Socotra).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 75 (Bacon).—SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 242 (Zamboanga).—GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol. 6, 1908-10, p. 223 (Durban).—WEBER, Siboga Exp., vol. 57,

- Fische, 1913, p. 204 (Sanguisapo, Sulu and Sulu Archipelago; north coast Kofian; Saleyer; Banda).—BEAUFORT, Bijd. Dierk. Amsterdam, 1913, p. 111 (Amboina).—PELLEGRIN, Bull. Soc. Zool. France, vol. 39, 1914, p. 224 (Fort Dauphin, Madagascar).—FOWLER, Copeia, No. 58, June 18, 1918, p. 63 (Philippines).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 483 (Natal coast).
- Epinephelus marginalis* BLOCH, Naturg. Auslând. Fische, vol. 7, 1793, p. 14, pl. 328, fig. 1. East Indian Seas.—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 300 (East Indies).
- Serranus marginalis* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 301 (Mauritius and Seychelles).—LAY and BENNETT, Zool. Beechey's Voy., Fish, 1839, p. 52 (Loo Choo).—RICHARDSON, Ichth. China, Japan, 1845, p. 233 (China and Japan).—PETERS, Arch. Naturg., 1855, p. 235 (Mozambique).—BREVOORT, Narr. Exp. China Japan, vol. 2, 1856, p. 258, pl. 3, fig. 2 (Simoda).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 135 (Amboyna, China, Japan, India, Louisiades, Darnley Island, Copang, Timor).—GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 23.—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 24 (Java).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 7 (Aden, Zanzibar, Johanna).—PETERS, Monatsb. Akad. Wiss. Berlin, 1865, p. 109 (type).—MEYER, Anal. Soc. Espan. Hist. Nat., Madrid, vol. 14, 1885, p. 9 (north Celebes; Cebu; Rubi, New Guinea).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 461 (Mindoro, Calapan, Pomay, Iloilo).
- Holocentrus erythraeus* SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 320. Red Sea.
- Holocentrus forskaeli* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 337, 377. Arabia.
- Holocentrus marginatus* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 342, 384. No locality.
- Holocentrus rosmarus* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 345, 389, pl. 7, fig. 2. The Great Ocean (Indo-Pacific).
- Holocentrus oceanicus* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 345, 389, pl. 7, fig. 3. The Great Ocean (Indo-Pacific).
- Serranus oceanicus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1822, p. 302. Mauritius and Massuah, Red Sea.—LAY and BENNETT, Zool. Beechey's Voy., Fish., 1839, p. 52 (Loo Choo).—PETERS, Arch. Naturg., vol. 1, 1855, p. 235 (Mozambique).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 109 (copied).—GORGÓZA, Anal. Soc. Españ. Hist. Nat. Madrid, vol. 17, 1888, p. 282 (Cebu).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 459 (Cebu, Samar).
- Serranus variolosus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 354. Tahiti.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 139 (copied).
- Perca maculata* (FORSTER) VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 354 (name in text).
- Serranus tsirimenara* SCHLEGEL, Fauna Japon., Poiss., pt. 1, 1842, p. 7, pl. 4A, fig. 3. Japan.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 144 (copied).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 150 (Nagasaki; Kobe).—KENT, Great Barrier Reef, 1893, p. 369 (Queensland).
- Serranus tsiremenara* STEINDACHNER and DÜDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 47, pt. 1, 1883, p. 232 (Tokio and Kochi).
- Epinephelus tsirimenara* SMITH and POPE, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 468 (Kochi).—JORDAN and RICHARDSON, Proc. U. S. Nat. Mus., vol. 37, 1910, p. 460, fig. 13 (Nagasaki, Tokyo, Wakanoura, Lord Howe

- Island).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 498 (Okinawa).—JORDAN and METZ, Mem. Carnegie Mus., vol. 6, No. 1, 1913, p. 32 (Fusan, Korea).—IZUKA and MATSUURA, Cat. Zool. Spec. Tokyo Mus., 1920, p. 153 (Tokyo).—JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1925, p. 236 (Toba).
- Epinephelus retouti* BLEEKER, Verslag. Meded. Akad. Wet. Amsterdam, ser 2, vol. 2, 1868, p. 339. Borbonia; Fauna Madagascar, Pollen, 1874, p. 21, pl. 12, fig. 1 (Borbonia).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 69, pl. 8, fig. 2.
- Serranus retouti* PETERS, Monatsb. Akad. Wiss. Berlin, 1876, p. 43 (Mauritius).
- ?*Serranus tigrinus* (not BLOCH) GORGOZA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 282 (Zumárraga, Samar).
- Epinephelus zapyrus* SEALE, Occas. Papers Bishop Mus., vol. 4, No. 1, 1906, p. 36, fig. 11. Tubuai, Cook Islands.

Depth $2\frac{4}{5}$ to $3\frac{1}{3}$; head $2\frac{1}{3}$ to $2\frac{2}{5}$, width $2\frac{1}{5}$ to $2\frac{2}{5}$. Snout $4\frac{1}{4}$ to $4\frac{3}{5}$ in head from snout tip; eye $3\frac{1}{2}$ to 5, $1\frac{1}{8}$ in snout with age but greater than snout in young, greater than interorbital at all ages; maxillary reaches three-quarters in eye or to its hind edge, expansion $1\frac{2}{3}$ to 2 in eye, length $2\frac{1}{8}$ to $2\frac{1}{3}$ in head from snout tip; teeth in villiform bands in jaws, at least anteriorly, with some inner front ones elongated and hinged; outer upper teeth slightly larger than inner and front pair of wide set canines; lower pair of closer front canines and teeth becoming triserial laterally with innermost row longest; bands of villiform teeth on each palatine and vomer, none on tongue; interorbital 10 to 11, little convex; preopercle edge with low serrae, those at angle most developed; opercular spines 3, lower little closer to median than latter to upper, which most advanced. Gill rakers 6+14, lanceolate though robust, slightly longer than gill filaments or $2\frac{1}{2}$ in eye; five above and six below rudimentary.

Scales 95 to 115 in lateral line to caudal base and 10 to 12 more on latter; tubes 45 to 80 in lateral line to caudal base and 2 or 3 more on latter; 13 to 15 scales above lateral line, 26 to 28 below, 70 to 74 predorsal, 43 to 45 obliquely across cheek from eye to preopercle angle; fins all with minute scales over greater basal portions; only upper fourth of maxillary scaled, with 8 transverse series of small scales. Scales with 4 to 7 basal radiating striae; 37 to 43 apical denticles, with 4 to 6 transverse series of basal elements, all denticles obsolete in young; circuli fine.

D. XI, 16, 1, third spine $2\frac{4}{5}$ to $3\frac{1}{2}$ in total head length, second ray $2\frac{1}{5}$ to 3; A. III, 8, 1, second spine $2\frac{2}{5}$ to $3\frac{3}{5}$, third ray $2\frac{1}{3}$ to $2\frac{1}{5}$; caudal $1\frac{3}{5}$ to $1\frac{7}{8}$, truncate, rounded convexly as expanded; least depth of caudal peduncle $3\frac{2}{5}$ to 4; pectoral $1\frac{2}{5}$ to $1\frac{3}{5}$; ventral 2 to $2\frac{1}{5}$.

Light to dull brown in alcohol, usually with 6 or 7 transverse darker bands, wider than interspaces, though often obscure. Iris pale brown. Fins usually pale, like general body color. Spinous dorsal always with black spot on membrane terminally behind each spine tip.

Red Sea, Arabia, Zanzibar, Mozambique, Natal, Réunion, Mauritius, Madagascar, Seychelles, India, Andamans, East Indies, Philippines, Riu Kiu, China, Japan, Queensland, Melanesia, Micronesia, Polynesia. The black checked edge to the spinous dorsal is a good diagnostic mark. Bleeker's largest specimen was 292 mm. though none of ours so large.

4966, 5179, 5223, 16296. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 98 to 217 mm.

16665, 22259. Canimo Island, near Daet, east coast of Luzon. June 15, 1909. Length 100 to 138 mm.

10969, 10970, 17073. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 176 to 210 mm.

8717, 12731. Capulaan Bay, Pagbilao Island, Chica Island, vicinity of Marinduque Island. February 24, 1909. Length 154 to 190 mm.

7618. Cataingan Bay, east of Masbate, near ship's anchorage. April 17, 1908. Length 139 mm.

5509. Catbalogan, Samar Island. April 15, 1908. Length 261 mm.

6933. Catbalogan. April 16, 1908. Length 186 mm.

7735. Caxisigan Island, Balabac. January 2, 1909. Length 212 mm. (1022).

6427, 13333. Caxisigan Island. January 3, 1909. Length 179 to 221 mm.

19031. Dasol Bay. May 8, 1909. Length 79 mm.

A1528. Doc Can Island, Sulu Sea. January 7, 1910. Length 232 mm.

4812. Jolo market. February 9, 1908. Length 267 mm.

9360, 18551. Langao Point, southern Luzon. June 24, 1909. Length 170 to 185 mm.

14348. Limbones Cove, Luzon. February 8, 1909. Length 160 mm. (1135).

7877, 7878, 14553. Maculabo Island, east coast Luzon. June 14, 1909. Length 157 to 193 mm.

6200. Malapascua Island, north of Cebu. March 16, 1909. Length 207 mm.

7611, 15897, 16394. Mansalay, Mindoro Island. June 4, 1908. Length 174 to 185 mm.

12141, 21515. Masamat Bay, Quinalasag Island. June 12, 1909. Length 155 to 192 mm.

17446, 17631. Mompog Island, Anabayas Islands. March 3, 1909. Length 121 to 208 mm.

11753. Pujada Bay. May 15, 1908. Length 120 mm.

18971. Quinalasag Island, Masamat Bay, east coast Luzon. June 12, 1909. Length 210 mm.

7016. Romblon. March 26, 1908. Length 181 mm.

19589. Simaluc Island, north of Tawi Tawi Group. September 22, 1909. Length 91 mm.

12605, 12606. Sitanki wharf. February 26, 1908. Length 125 to 137 mm.

16040, 16041. Sulade Island, vicinity of Jolo. September 18, 1909. Length 124 to 175 mm.

16203. Taganak Island, Jolo Sea. January 7, 1909. Length 160 mm.

16267. Teomabal Island, vicinity of Jolo. September 18, 1909. Length 91 mm.

7660, 7661, 7662, 7663. Usada Island, near Jolo. March 5, 1908. Length 135 to 184 mm. (383 to 386).

5929. Zamboanga. May 25, 1908. Length 285 mm.

A1559. Nan Wan, Kua Siang, Formosa. January 25, 1910. Length 288 mm.

13689. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 191 mm.

14737. Kayoa Island. November 29, 1909. Length 173 mm.

SERRANUS RHYNCHOLEPIS Bleeker

Serranus rhyncholepis BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 749. Celebes.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 105 (copied).—FOWLER, Mem. Bishop Mus., vol. 10, 1928; p. 181 (New Guinea).

Epinephelus rhyncholepis BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 62, pl. (8) 286, fig. 2 (Celebes, Timor).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 231 (copied).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 498 (Okinawa, Riu Kiu).

Depth $2\frac{7}{8}$ to 3; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{5}$ to $2\frac{1}{4}$. Snout $4\frac{2}{5}$ to $4\frac{2}{3}$ in head from snout tip; eye $4\frac{2}{5}$ to 5, 1 to $1\frac{1}{8}$ in snout, greater than interorbital; maxillary reaches opposite hind eye edge or slightly beyond, expansion $1\frac{2}{3}$ to 2 in eye, length $2\frac{1}{8}$ to $2\frac{1}{5}$ in head from snout tip; teeth small, pointed, in bands in jaws, pair of canines in front of each; upper lateral teeth larger than others, erect, though inner anterior longest and like all inner teeth hinged; mandibular teeth in 3 or 4 rows anteriorly, narrowing to 2 pairs posteriorly and all inner ones longest and hinged; bands of small teeth on vomer and palatines, none on tongue; nostrils subequal; interorbital $6\frac{1}{2}$ to $6\frac{3}{4}$, very slightly convex; preopercle edge finely denticulate, several serrae little larger at angle; opercular spines 3, lower closer to median, uppermost most advanced. Gill rakers 8 + 14, finely spinescent, lanceolate, little longer than gill filaments or $2\frac{1}{4}$ in eye; 5 above and 5 below rudimentary.

Scales 83 to 94 in lateral line to caudal base and 12 to 15? more on latter; tubes 53 to 55 in lateral line to caudal base and 3 to 5 more on latter; 15 scales above lateral line, 26 to 35 below, 50 to 52 predorsal forward to snout end; 32 rows obliquely across cheek to opercle angle; with age scales all crowded with basal auxiliary scales; fins covered basally with minute scales; maxillary scaleless. Scales with 3 to 16 basal radiating striae; 38 to 48 apical denticles, with 6 or 7 transverse series of basal elements; circuli fine.

D. XI, 16, 1 or 17, 1, fourth spine $2\frac{1}{2}$ to $2\frac{3}{5}$ in total head length, first ray $2\frac{3}{5}$ to $3\frac{1}{10}$; A. III, 7, 1, second spine $4\frac{1}{4}$ to $4\frac{3}{5}$, fourth ray $2\frac{1}{2}$ to $2\frac{4}{5}$; caudal $1\frac{4}{5}$ to $1\frac{7}{8}$, convex behind; least depth of caudal peduncle $3\frac{1}{3}$ to $3\frac{1}{2}$; pectoral $1\frac{3}{4}$ to $1\frac{4}{5}$; ventral $2\frac{1}{3}$ to $2\frac{2}{5}$.

In alcohol brown, each scale on body with minute gray white dot. Also small close set white dots over top of head and same extend over fin bases. Iris brown. Fins more or less shaded darker brown terminally.

Known only from the East Indies, though we now report it from the Philippines and Riu Kiu. According to Boulenger reaches 300 mm., though our largest examples larger.

8433. Cebu market. March 24, 1909. Length 310 mm.

5931, 6001, 6004. Zamboanga market. May 25-27, 1908. Length 270 to 335 mm.

A798. Zamboanga market. October 9, 1909. Length 377 mm.

A1620. Nafa, Riu Kiu. February 7, 1910. Length 320 mm.

SERRANUS MERRA (Bloch)

Epinephelus merra BLOCH, *Naturg. Auslând. Fische*, vol. 7, pt. 10, 1793, p. 17, pl. 329. Japan Sea.—SHAW and NODDER, *Nat. Miscellany*, vol. 10, 1790, p. 382 (Japan Sea).—SCHNEIDER, *Syst. Ichth.* Bloch, 1801, p. 300 (Indian Ocean, Japan, Coromandel).—BLEEKER, *Atlas Ichth. Ind. Néerland.*, vol. 7, 1873-76, p. 55 (Sumatra, Batu, Nias, Pinang, Singapore, Cocos Islands, Java, Celebes, Sangir, Timor, Letti, Flores, Ternate, Obi major, Buru, Ceram, Amboina, Waigiu, Philippines, New Guinea).—STREETS, *Bull. U. S. Nat. Mus.*, No. 7, 1877, p. 92 (Christmas Island).—BLEEKER, *Verh. Akad. Wet. Amsterdam*, vol. 18, No. 3, 1879, p. 1 (Mauritius).—BOULENGER, *Cat. Fish. Brit. Mus.*, vol. 1, 1895, p. 24 (Zanzibar, Mauritius, Rodriguez, Andamans, China, Riu Kiu, East Indies, Philippines, Java, Amboyna, Duke of York Island, Solomons, Aneiteum, Samoa, Fiji, Micronesia, East Australia, Madagascar, Torres Straits, Seychelles, Moluccas).—FOWLER, *Proc. Acad. Nat. Sci. Philadelphia*, 1899, p. 485 (Thornton Island).—STEINDACHNER, *Abh. Senckenberg. Naturf. Ges.*, vol. 25, 1900, p. 414 (Batjan, Ternate).—JORDAN and SNYDER, *Annot. Zool. Japon.*, vol. 3, 1901, p. 75 (Riu Kiu).—REGAN, *Journ. Bombay Nat. Hist. Soc.*, vol. 16, No. 2, 1905, p. 329 (Persian Gulf), p. 331 (Muscat).—JORDAN and SEALE, *Bull. Bur. Fisher.*, vol. 25, 1905 (1906), p. 258 (Apia).—EVERMANN and SEALE, *Bull. Bur. Fisher.*, 26, 1906 (1907), p. 75 (Bacon).—REGAN, *Journ. Linn. Soc. London*, vol. 12, ser. 2, 1907, p. 222 (Maldives).—SEALE and BEAN, *Proc. U. S. Nat. Mus.*, vol. 33, 1907, p. 242 (Zamboanga).—GILCHRIST and THOMPSON, *Ann. South Afric. Mus.*, vol. 6, 1908-10, p. 22 (Durban).—SNYDER, *Proc. U. S. Nat. Mus.*, vol. 42, 1912, p. 497 (Okinawa).—WEBER, *Siboga Exp.*, vol. 57, *Fische*, 1913, p. 204 (Seba, Savu; Lumulumu and Kabaladua; Borneo Bank; Muaras Reef, Celebes Sea; Sanguisiapo, Sulu Archipelago; Karkaralong Island; Salibabu; Salomakie; Saleyer; Binongka; Lucipara; Nalahia; Banda; Hoch Key; Roma; east point Timor; Pepela Bay; Solor).—SEALE, *Philippine Journ. Sci.*, vol. 9, 1914, p. 65 (Hong Kong).—FOWLER and BEAN, *Proc. U. S. Nat. Mus.*, vol. 62, 1922, p. 28 (Zamboanga).—FOWLER and SILVESTER, *Marine Pap. Carnegie Inst.*, 1922, p. 118 (Pago Pago).—FOWLER, *Proc. Acad. Nat. Sci. Philadelphia*, 1923, p. 39 (Madagascar); *Bishop Mus. Bull.*, No. 22, 1925, p. 9 (Guam), p. 33 (Samoa).—BARNARD, *Ann. South Afric. Mus.*, vol. 21, 1927, p. 483 (Natal coast).

Holocentrus merra LACÉPÈDE, *Hist. Nat. Poiss.*, vol. 4, 1802, pp. 343, 384 (Japan).

Serranus merra LAY and BENNET, *Zool. Beechey's Voy.*, *Fish*, 1839, p. 52 (Loo Choo).—VALENCIENNES, *Hist. Nat. Poiss.*, vol. 2, 1829, p. 325 (Japan, East Indies, Red Sea, Waigiu, Timor, Mauritius, Bourbon, Seychelles, Borabora, Oualan).—PETERS, *Arch. Naturg.*, 1855, p. 235 (Mozambique).—GUICHENOT, *Notes Ile Réunion*, vol. 2, 1862, p. 23. —PETERS, *Monatsh. Akad. Wiss. Berlin*, 1876, p. 435 (Mauritius).—CASTELNAU, *Proc. Linn. Soc. New South Wales*, vol. 3, 1878, p. (349) 365 (Port Jackson).—FOWLER, *Proc. Acad. Nat. Sci. Philadelphia*, 1907, p. 255 (Thornton Island and Apia, Samoa); 1925, p. 222 (Natal).—FOWLER and BALL, *Bishop Mus. Bull.*, No. 26, 1925, p. 14 (Wake Island).—FOWLER, *Bishop Mus. Bull.*, No. 38, 1927, p. 14 (Fanning, Christmas, Jarvis, Tongareva, Howland and Baker Islands).—FOWLER and BEAN, *Proc. U. S. Nat. Mus.*,

- vol. 71, 1927, p. 6 (Poeloe Toekus Island, Sumatra).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 181 (Society Islands, Apiang, Gilbert Islands, Marshalls, Ebon Island, Ascension Island, Carolines, Ponapé, Strong Island, Fiji, Samoa, Polynesia?, Tempe, Tahiti, Fanning Islands, Apia, Solomons, Makemo, Rangiroa, Mangareva, Guam, Faté, Rarotonga, Tubuai, Marcus Island, Wake Island, Thornton Island).
- Serranus hexagonatus* var. *merra* GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 141 (Singapore, China, Philippines, India).—GORGEOZA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 262 (Nasugbu; Manila).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 462 (Cavite Naie, Nasugbu).
- Holocentrus hexagonatus* SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 323. Tahiti.
- Perca hexagonata* (FORESTER) SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 323 (name in synonymy).
- Serranus hexagonatus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1829, p. 330 (Borabora and Oualan); vol. 6, 1830, p. 516 (Carteret Harbor, New Ireland).—GUERIN, Iconogr. Règne Animal, Poiss., 1829-44, p. 3, pl. 4, fig. 1 (Borabora and Oualan).—RICHARDSON, Ichth. Voy. Sulphur, vol. 1, 1844, p. 82, pl. 38, fig. 1 (South Pacific).—CANTOR, Cat. Malayan Fishes, 1849, p. 7 (Pinang Sea).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 503 (reference).—GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 23.—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 25 (Hong Kong, Sydney, Nicobars).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 10 (Zanzibar; Great Comoro).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 683 (Koseir, Red Sea).—GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 7, pl. 7, figs. *a-b* (Society Islands, all Polynesia).—DAY, Fishes of India, pt. 1, 1875, p. 14 (Andamans).—ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 263 (Palm Islands, Queensland).—MARTENS, Preuss. Exp. Ost-Asien, vol. 1, 1876, p. 386 (Benkoelen, Sumatra; Singapore; Amboina).—PETERS, Monatsb. Akad. Wiss. Berlin, 1876, p. 435 (Mauritius).—GÜNTHER, Philos. Trans. Roy. Soc. London, vol. 168, 1879, p. 470 (Rodriguez).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 150 (Ceylon).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 8 (Manado, Celebes; Ternate; Kordo, Mysore).—DAY, Fauna Brit. India, vol. 1, 1889, p. 447.—THURSTON, Notes Pearl Fisher. Manaa, 1890, p. 91 (Pamban).—KENT, Great Barrier Reef, 1893, p. 281 (Port Darwin), p. 369 (Queensland).—WEBER, Semon's Zool. Forsch. Reis. Australia, vol. 5, 1895, p. 262 (Amboina).
- Epinephelus hexagonatus* BLEEKER, Nederland. Tijdschr. Dierk., vol. 1, 1863, p. 344 (Madagascar); Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (23) 301, fig. 2.—PELLEGRIN, Bull. Soc. Zool. France, vol. 39, 1914, p. 224 (Diego-Suarez and Mubambo, Madagascar).
- Serranus faveatus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 329. Seas of India, Mauritius, Ceylon.—GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 23.
- Serranus nigriceps* VALENCIENNES, Hist. Nat. Poiss., vol. 6, 1830, p. 517. No locality (on M. Gaimard).
- Serranus confertes* BENNETT, Life of Raffles, 1830, p. 686. Sumatra.
- Serranus stellans* RICHARDSON, Ann. Mag. Nat. Hist., vol. 9, 1842, p. 23. Melville Island on South side of Torres Straits.
- Epinephelus stellans* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 54 (Amboina); vol. 8, 1876-77, pl. (54) 382, fig. 4.
- Epinephelus stellatus* SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 498 (Okinawa).

Serranus reevesii RICHARDSON, Ichth. China, Japan, 1846, p. 232. Canton, China.

Pomacentrus punctatus (RUSSELL) GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 141. India. (Name in text).

Depth $2\frac{4}{5}$ to $3\frac{1}{2}$; head $2\frac{1}{3}$ to $2\frac{2}{5}$, width $2\frac{1}{8}$ to $2\frac{2}{5}$. Snout $4\frac{1}{8}$ to $5\frac{1}{3}$ in head from snout tip; eye $4\frac{1}{8}$ to $5\frac{2}{3}$, slightly greater than snout in young and subequal with age, greater than interorbital at all ages; maxillary reaches opposite hind eye edge in young, little beyond with age, expansion $1\frac{2}{5}$ to 2 in eye, length $2\frac{1}{10}$ to $2\frac{1}{5}$ in head from snout tip; teeth fine, conic, in bands in jaws; pair of small, upper, wide set canines, often double and inner row of teeth hinged and those anteriorly inside longest; mandibular teeth several series in front narrowing biserial posteriorly, inner row hinged, especially inner front ones and pair of front canines often double; band of fine teeth on each palatine and on vomer, none on tongue; nostrils together, posterior little larger than front one to double its diameter; interorbital $6\frac{3}{4}$ to $7\frac{1}{4}$ in head, slightly convex; hind preopercle edge denticulate, some serrae at angle little larger; opercular spines 3, upper most advanced, nearer median. Gill rakers 7 + 15, lanceolate, equal gill filaments or $\frac{1}{2}$ of eye; 5 above and 5 below rudimentary.

Scales 92 to 94 in lateral line to caudal base and 10 to 12? more on latter; tubes 48 to 52 in lateral line to caudal base and 2 or 3 more on latter; 15 to 17 scales above lateral line, 27 to 31 below, 56 to 62 predorsal, 25 to 27 obliquely from lower hind eye edge to preopercle angle; small auxiliary basal scales present, especially on head, fewer on body; fins all more or less finely scaled, at least basally; upper half of maxillary expansion scaly, scales in 5 to 9 rows transversely. Scales with 6 or 7 basal radiating striae; 28 to 38 apical denticles, with 4 or 5 transverse series of basal elements; circuli fine.

D. XI, 16, 1, third spine $2\frac{1}{3}$ to 3 in total head length, first ray $2\frac{1}{3}$ to $2\frac{2}{3}$; A. III, 8, 1, second spine $2\frac{1}{2}$ to $3\frac{1}{8}$, fifth ray $2\frac{1}{10}$ to $2\frac{1}{4}$; caudal $1\frac{3}{5}$ to $1\frac{3}{4}$, convexly rounded behind; least depth of caudal peduncle $3\frac{2}{3}$ to $4\frac{2}{5}$; pectoral $1\frac{2}{5}$ to $1\frac{3}{4}$; ventral 2 to $2\frac{1}{5}$.

Generally light brown, forming nearly whitish reticulating lines around variably hexagonal, pentagonal or rounded deep brown blotches. These latter very variable, sometimes several may be fused to form longitudinal bands variably short or long. Sometimes several groups of dark blotches may be emphasized along bases of dorsals to show several dark saddle-like blotches. Often on belly white reticulations may be broad as the spots which thus appear well separated. Iris brown. On fins white reticulations or lines usually narrow, the pectoral more finely spotted than the others, though it is very variable as the dark spots sometimes formed extremely small.

Red Sea, Arabia, Persian Gulf, Zanzibar, Mozambique, Natal, Mauritius, Réunion, Bourbon, Madagascar, Rodriguez, Seychelles,

Maldives, India, Ceylon, Andamans, East Indies, Philippines, Riu Kiu, China, Japan, East Australia, Queensland, Melanesia, Micronesia, Polynesia. One of the most abundant as well as handsome of the

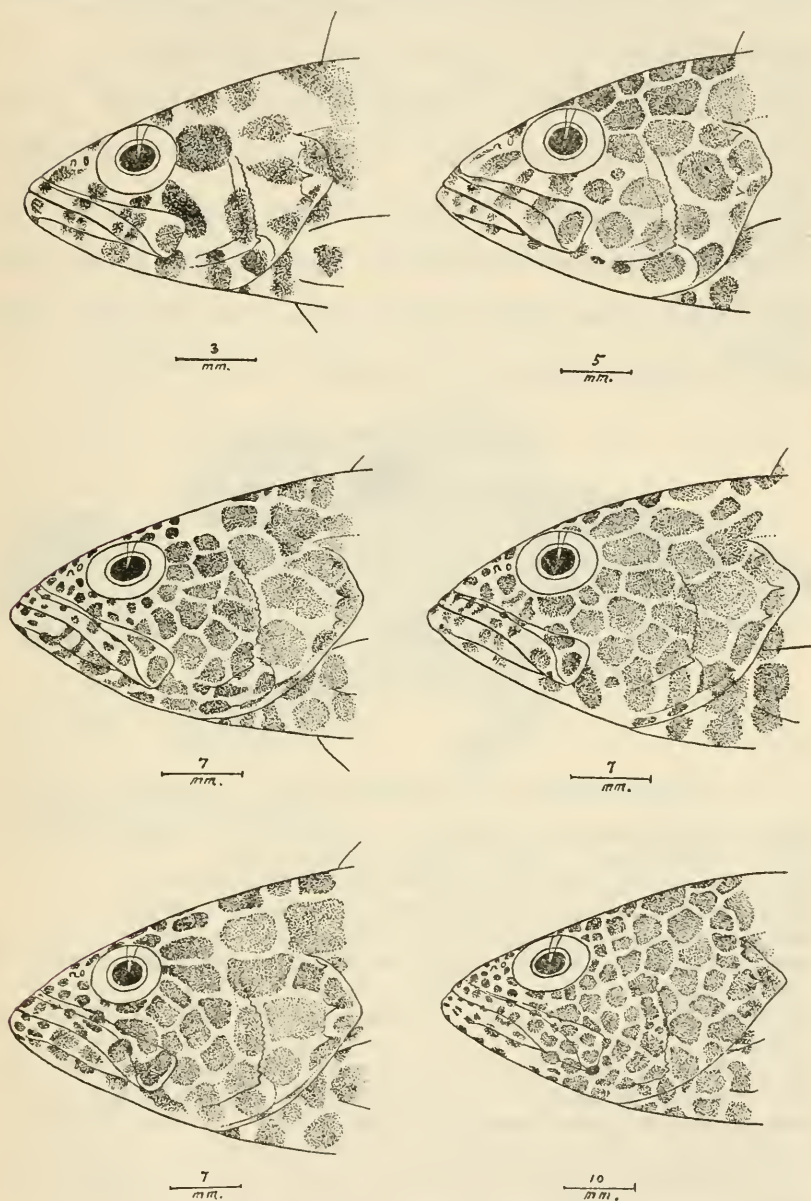


FIGURE 16.—*SERRANUS MERRA* (BLOCH), VARIATION

groupers of the Indo-Pacific. Boulenger gives the maximum size as 320 mm. but all our examples much smaller. It is often quite variable and we have listed some examples under the variety *stellans*,

differing from the usual run of material chiefly in the presence of contrasted black blotches on the back. These are usually as 4 blotches along the bases of the dorsals, though in the very young at least one at the last dorsal spines frequently greatly contrasted.

12246, 18932. Batan Island. June 5, 1909. Length 165 to 187 mm.

19470. Batan Island. July 22, 1909. Length 62 mm.

17431. Bulan Island, south of Zamboanga. September 13, 1909. Length 126 mm.

7250, 7251. Busbus Point, Siasi Island. September 20, 1909. Length 108 to 161 mm.

9846 to 9849. Cagayan, Sulu Archipelago. January 8, 1909. Length 113 to 187 mm.

12951, 12952. Candaraman Island, Balabac. January 4, 1909. Length 169 to 173 mm.

10781. Dalaganem Island, vicinity eastern Palawan. April 8, 1909. Length 200 mm.

8143. Dasol Bay, west coast Luzon. May 9, 1909. Length 161 mm.

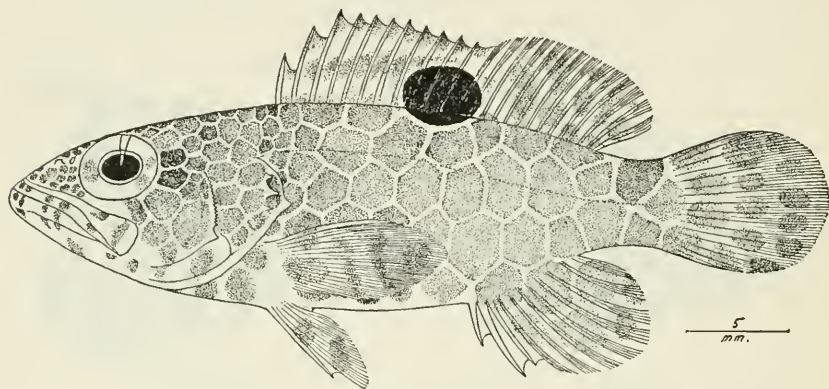


FIGURE 17.—*SERRANUS MERRA* (BLOCH), VARIATION OR YOUNG *STELLANS*

14423. Gubat Sorgoson, east coast Luzon. June 23, 1909. Length 215 mm.

21587. Guinayan Island. June 4, 1909. Length 115 mm.

6597. Hermana Mayor Island, west coast Luzon. May 8, 1909.

6954, 13982. Iloilo market. May 31, 1908. Length 160 to 190 mm.

12535. Jolo market. February 13, 1908. Length 158 mm.

18410, 18411, 18418. Limbones Cove, Luzon. January 17, 1908. Length 163 to 200 mm.

5977, 14833, 22237. Little Santa Cruz Island. May 26, 1908. Length 123 to 223 mm.

6046, 18537. Little Santa Cruz Island. May 28, 1908. Length 163 to 171 mm.

4736. Maricaban Island, Luzon. January 20, 1908. Length 155 mm.

12498, 12499. North west Verde Island. July 22, 1908. Length 162 to 187 mm.

One example. Philippines, Length 213 mm. (107).

11205. Porongpong Island, Palumbanes Island. June 11, 1909. Length 188 mm.

10492. Port Maricaban. July 21, 1908. Length 213 mm.

4612, 12655, 14256. Port Palapag. June 3, 1909. Length 140 to 194 mm.

6135. Puerta Princesa, Palawan Island. April 5, 1909. Length 166 mm.

10755. Quinalasag Island, Masamat Bay. June 12, 1909. Length 173 mm.

- 12599, 12600, 13273. Rapurapu Island. June 22, 1909. Length 125 to 146 mm.
14095. Sabtan Island. November 8, 1908. Length 166 mm.
15705. Sanguisiapo Island, Sulu Archipelago, Tawi Tawi Group. February 24, 1908. Length 172 mm. (287).
- 6617 to 6619, 22183, 22184. Simaluc Sibi Sibi Island. September 23, 1909. Length 72 to 158 mm.
- 4654 to 4657, 18603, 20706. Tambul Sigambul, Tonquil Island, south of Zamboanga. September 14, 1909. Length 111 to 219 mm.
- 21898 to 21900. Tapiantana Island. September 13, 1909. Length 140 to 227 mm.
7155. Teomabul Island. September 18, 1909. Length 190 mm.
- 18771 to 18774. Tictauan Island. September 8, 1909. Length 125 to 199 mm.
- 6649, 6650, 7918. Tutu Bay, Jolo Island, second anchorage. September 19, 1909. Length 181 to 202 mm.
13423. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 156 mm.
9704. Talisse Island, north of Celebes. November 9, 1909. Length 170 mm.
- 13551, 13552. Tanakeke Island, Flores Sea. December 21, 1909. Length 185 to 209 mm.
- 21489, 22682. Gane Road, Gillolo Island. December 1, 1909. Length 86 to 118 mm.
13294. Gomomo Island. December 3, 1909. Length 178 mm.
- 12801, 12942, 21547. Tidore Island, south of Ternate. November 25, 1909. Length 131 to 169 mm.
9955. Doc Can, Sulu Sea. January 7, 1910. Length 104 mm.
1956. Tokyo market, Japan. 1896. Length 210 mm.
- 12885 to 12887. Apra Bay, Guam. November 19-21, 1907. Length 172 to 176 mm.

The following represent the variety *stellans*:

- 18415 to 18417. Limbones Cove, Luzon. January 17, 1908. Length 176 to 182 mm.
- Forty-seven examples. Tomahu Island, vicinity Bouro Island, Dutch East Indies. Length 40 to 87 mm.
- Sixteen examples. Tomahu Island. December 12, 1909. Length 41 to 63 mm.

SERRANUS AWOARA Schlegel

Serranus awoara SCHLEGEL, Fauna Japon., Poiss., pt. 1, 1842, p. 9, pl. 3, fig. 2. Japan.—RICHARDSON, Ichth. China, Japan, 1846, p. 231 (Japan).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 150 (China).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 26 (Singapore).—STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 47, pt. 1, 1883, p. 23 (Tokyo and China Sea).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 46 (Luzon, Cavite, Santa Cruz).

Epinephelus awoara BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 59 (on KNER).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 230 (China).—JORDAN and SNYDER, Annot. Zool. Japon., vol. 3, 1901, p. 74 (Nagasaki and Riu Kiu).—JORDAN and RICHARDSON, Mem. Carnegie Mus., vol. 6, No. 4, 1909, p. 183 (Takao, Formosa); Proc. U. S. Nat. Mus., vol. 37, 1910, p. 457, fig. 12 (Takao).—JORDAN and METZ, Mem. Carnegie Mus., vol. 6, No. 1, 1913, p. 32 (Fusan, Korea).—IZUKA and MATSUURA, Cat. Zool. Spec. Tokyo Mus., 1920, p. 153 (Tokyo).—JORDAN

and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, 1922 (1926), p. 236 (Mikawa Bay; Miyazu Fukui).—TANAKA, Figs. Descript. Fishes Japan, vol. 37, July 10, 1927, p. 693, pl. 108, fig. 442 (Saiki).

Depth $2\frac{1}{8}$; head $2\frac{1}{2}$, width 2. Snout $4\frac{1}{8}$ in head from snout tip; eye $\frac{1}{8}$, equals snout, greater than interorbital; maxillary reaches slightly beyond eye, expansion $1\frac{3}{4}$ in eye, length 2 in head from snout tip; teeth in bands in jaws, inner upper larger and biserial along sides of mandible; small teeth on vomer and palatines; pair of canines in front of each jaw; interorbital $6\frac{1}{5}$, slightly convex; hind preopercle edge serrate, with 2 serrae at angle little larger; opercle with upper spine more distant from median than lowest, also most forward. Gill rakers 8 + 16, lanceolate, equal gill filaments or 2 in eye; 4 upper and 4 lower rudimentary.

Scales 93 along lateral line to caudal base; tubes 60 in lateral line to caudal base and 5 more on latter; 17 scales above lateral line, 28 below, 58 predorsal forward to front nostrils, about 20 rows across cheek to opercle angle; maxillary scaleless. Vertical fins all more or less finely scaled. Scales with 4 or 5 basal radiating striae; 18 to 20 apical denticles, slender, 4 or 5 series transversely; circuli rather coarse.

D. XI, 15, 1, third spine $2\frac{2}{5}$ in total head length, first ray $2\frac{2}{5}$; A. III, 8, 1, second spine $3\frac{3}{5}$, third ray $2\frac{1}{8}$; caudal $1\frac{2}{3}$, convex behind; least depth of caudal peduncle $3\frac{1}{3}$; pectoral $1\frac{1}{2}$; ventral $1\frac{7}{8}$.

Largely uniform brownish. Two pairs of broad, darker brown bands on body transversely, first from spinous dorsal and second from soft dorsal, all extending on dorsal fins. Also fifth transverse dark brown band on caudal peduncle. Caudal and pectoral mottled with paler brown. Ventral and anal dusky brown.

China, Formosa, Korea, Japan, Riu Kiu. Reported by Elera from the Philippines. The above description from a Japanese example in the United States National Museum obtained by E. S. Morse in 1878, length 127 mm.

SERRANUS CORALLICOLA Valenciennes

Serranus corallicola (KUHL and VAN HASSELT) VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 336. No locality.—DAY, Fishes of India, pt. 1, 1875, p. 20; Fauna Brit. India, vol. 1, 1889, p. 451.—WEBER, Semon's Zool. Forch. Reis. Australia, vol. 5, 1895, p. 262 (Amboina).—FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925, p. 14 (Wake Island).—FOWLER, Bishop Mus. Bull., No. 38, 1927, p. 14 (Fanning and Christmas Islands); Mem. Bishop Mus., vol. 10, 1928, p. 181 (Shortland, Tubuai, Tahiti, Raiatea, Mangareva, Rarotonga, Marcus Island, Makatea, Palmyra, Wake Island, Apia).

Epinephelus corallicola BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 53 (Java, Singapore, Celebes, Amboina).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 236 (Malay Archipelago, Manado, Pelew Islands, Mortlock, Ponapé, Greenwich, Howland Islands).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 259 (Apia).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 203 (Haingisi, Samar Island).

Serranus miliaris VALENCIENNES, Hist. Nat. Poiss., vol. 6, 1830, p. 520. New Guinea.

Serranus altivelioides BLEEKER, Verh. Batav. Genootsch. (Perc.), vol. 22, 1849, p. 38. Batavia.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 127 (copied).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 23 (Singapore; Madras).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 461 (Samar).

Serranus altivelioides MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 9 (North Celebes).

Epinephelus altivelioides BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (30) 308, fig. 1.

Serranus macrospilos BLEEKER, Nat. Tijds. Nederland. Indië, vol. 9, 1855, p. 499. Batjan.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 149 (copied).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 9 (Manado, Celebes).

Epinephelus macrospilus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 22, pl. (12) 209, fig. 2 (Java, Celebes, Batjan, Solor, Amboina).

Serranus howlandi GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 8, pl. 9, fig. B. Howland Island and Tahiti.

Serranus cruentus DE VIS, Proc. Linn. Soc. New South Wales, vol. 8, 1883, p. 446. New Britain.

Depth $2\frac{7}{8}$ to 3; head $2\frac{1}{3}$ to $2\frac{1}{2}$, width $2\frac{1}{6}$ to $2\frac{1}{3}$. Snout $4\frac{3}{4}$ to $5\frac{1}{5}$ in head from snout tip; eye $4\frac{1}{2}$ to $6\frac{1}{2}$, greater than snout in young to $1\frac{2}{5}$ with age, always greater than interorbital; maxillary reaches to or slightly beyond hind eye edge, expansion $1\frac{1}{4}$ to $1\frac{2}{5}$ in eye, length $2\frac{1}{3}$ to $2\frac{2}{5}$ in head from snout tip; teeth villiform, in broad bands in jaws, on vomer and palatines but none on tongue, narrowing to 3 or 2 rows posteriorly in mandible; nostrils together, posterior greatly larger with age or its vertical diameter nearly equals pupil; interorbital 6 to $6\frac{3}{4}$ in head, very slender, convex; hind preopercle edge finely serrate in young, with spine at angle, serrae minute or obsolete with age; opercular spines 3, lower little closer to median, upper most advanced. Gill rakers 9+16, lanceolate, robust, little less than gill filaments or $2\frac{3}{5}$ in eye; 9 above and 5 below rudimentary.

Scales 85 to 104 in lateral line to caudal base and 15 to 20 more on latter; tubes 53 to 59 in lateral line to caudal base and 2 or 3 more on latter; 20 scales above lateral line, 25 to 31 below, 80 to 95 predorsal forward nearly to snout tip; 50 rows obliquely over cheek from lower hind eye edge to preopercle angle; fins all minutely scaled over greater portions basally; upper $\frac{2}{5}$ of maxillary expansion scaly, scales in about 14 transverse rows. Scales with 5 to 8 basal radiating striae; 8 to 10 apical denticles, compact in young, absent with age; circuli moderately fine.

D. X or XI, 15, 1 or 16, 1, fourth spine $2\frac{7}{8}$ to $3\frac{1}{5}$ in total head length, first ray $2\frac{1}{2}$ to $3\frac{2}{3}$; A. III, 8, 1, second spine $3\frac{1}{5}$ to $4\frac{1}{2}$, fifth ray $2\frac{1}{5}$ to $2\frac{1}{2}$; caudal $1\frac{3}{5}$ to $1\frac{7}{8}$, convexly rounded behind; least depth of caudal peduncle $3\frac{3}{5}$ to $3\frac{2}{3}$; pectoral $1\frac{3}{5}$ to $1\frac{4}{5}$; ventral $1\frac{1}{5}$ to $2\frac{1}{3}$.

In alcohol light sienna or brown, little paler below. Body and fins everywhere with small round blackish spots, largest not over half pupil and none greater in diameter than width of pale interspaces. In young dark spots comparatively large and greatly fewer. Adult with 4 or 5 dark obscure saddles along back at bases of dorsals, also one may be present as saddle on caudal peduncle above; all saddles appear as if underlaid, though little evident in young. Fins of adult somewhat darker gray terminally. Pectoral sometimes with narrow whitish margin. Iris brown.

India, Bengal Bay, East Indies, Philippines, Melanesia, Micronesia, Polynesia. We follow Boulenger in retaining this species, though Tanaka has merged it with *Serranus fario* (Thunberg). Although Boulenger gives *Serranus howlandi* Günther as a synonym it differs from all our examples in the larger and closer set dark spots, also its pectoral is largely unspotted, besides the fins are with greatly fewer spots. We have much larger specimens than Boulenger gives, which largest is 385 mm. Our materials agree entirely in the small size of the spots, their distribution and in having the pectoral always entirely spotted.

6511. Balikias Bay, China Sea, vicinity southern Luzon. June 17, 1908. Length 287 mm.
 14505. Biri Channel, Batag Island, east coast Luzon. June 2, 1909. Length 247 mm.
 7814. Bugsuk Island, North Balabac Strait. January 5, 1909. Length 483 mm.
 8802 to 8804. Butauanan Island. June 13, 1909. Length 284 to 479 mm.
 8378. Calangaman Island, between Leyte and Cebu. March 16, 1909. Length 446 mm.
 7552. Endeavor Strait, Malampaya Sound, Palawan Island. December 23, 1908. Length 276 mm.
 1702. Galvaney Island, Ragay Gulf, Luzon. March 9, 1909. Length 140 mm.
 11770. Iloilo market, Iloilo. June 2, 1908. Length 166 mm.
 8364. Malapaseua Island, north of Cebu. March 16, 1909. Length 298 mm.
 6300, 6301. Manila market, Manila. June 13, 1908. Length 236 to 246 mm.
 9335. Murcielagos Bay, Mindanao Island. August 21, 1909. Length 445 mm.
 5903. Polloc, Mindanao. May 22, 1908. Length 214 mm. (99). Brownish or slaty with numerous darker spots. Soft verticals become darker vertically, narrowly edged with white.
 8790. Quinalasag Island, Masamat Bay, east coast of Luzon. June 12, 1909. Length 261 mm.
 A1465. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 363 mm.

SERRANUS CAERULEO-PUNCTATUS (Bloch)

Holocentrus caeruleo-punctatus BLOCH, *Naturng. Ausländ. Fische*, vol. 4, 1790, p. 94, pl. 241, fig. 2. No locality.—WALBAUM, *Artedi Pisc.*, vol. 3, 1792, p. 646 (on BLOCH).—LACÉPÈDE, *Hist. Nat. Poiss.*, vol. 4, 1802, pp. 340, 384 (on BLOCH).

Serranus caeruleopunctatus VALENCIENNES, *Hist. Nat. Poiss.*, vol. 2, 1828, p. 366 (no locality).—PETERS, *Monatsb. Akad. Wiss. Berlin*, 1865, p. 108 (type).—FOWLER, *Proc. Acad. Nat. Sci. Philadelphia*, 1925, p. 224 (Natal).

Serranus caeruleo-punctatus FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 183 (Shortland and Marquesas Islands).

Epinephelus caeruleopunctatus BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 246 (Zanzibar, Mauritius, Ceylon, Philippines, Seychelles, Borneo, Malay Archipelago, Amboina, Ponapé).—SNYDER, Proc. U.S. Nat. Mus., vol. 42, 1912, p. 414 (Tanegashima), p. 498 (Okinawa).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 205 (Lirung, Saleyer, Nusa Laut).—PELLEGRIN, Bull. Soc. Zool. France, vol. 39, 1914, p. 224 (Diego-Suarez, Madagascar).—REGAN, Ann. Durban Mus., vol. 2, 1917–20, p. 197 (Durban, Natal).—McCULLOCH, Proc. Linn. Soc. New South Wales, vol. 46, pt. 4, 1921, p. 468 (Two Islands and Palm Islands, Queensland; New Hebrides; New Caledonia; Bougainville Island; Batavia).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1923, p. 39 (Madagascar).—BARNARD,

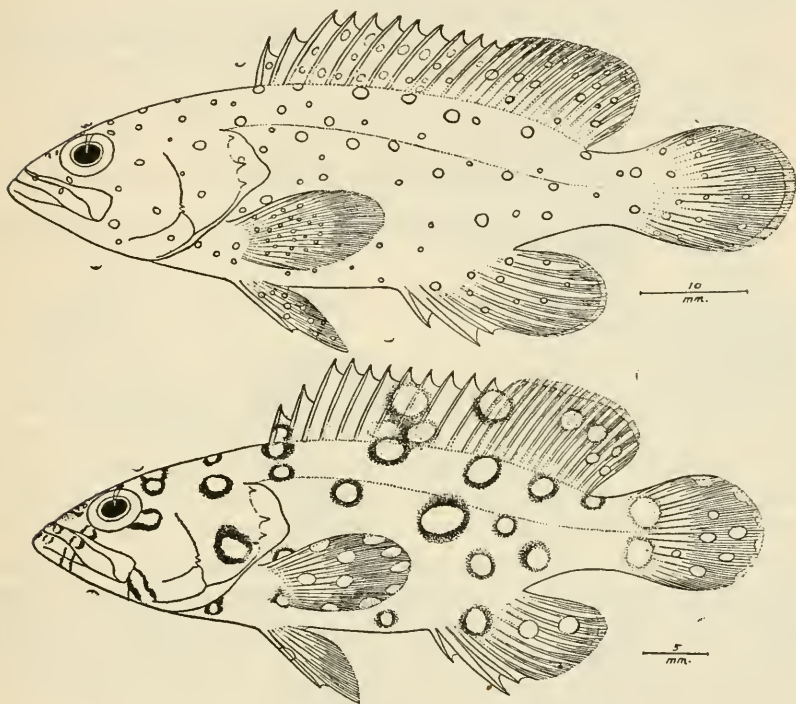


FIGURE 18.—*SERRANUS CAERULEO-PUNCTATUS* (BLOCH), YOUNG

Ann. South Afric. Mus., vol. 21, 1927, p. 485 (Natal coast).

Serranus (*Epinephelus*) *caeruleopunctatus* ZUGMAYER, Abh. Bayer. Akad. Wiss., Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 10 (Oman).

Serranus leucostigma (EHRENBERG) VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 346. Massauah, Red Sea.—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 677 (Red Sea).—MARTENS, Preuss. Exp. Ost-Asien, vol. 1, 1876, p. 387 (Amboina River).

Serranus summana (part) RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 104 (note).

Serranus sumana KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 685 (Red Sea); Fische Roth. Meer., 1884, p. 5, pl. 2, fig. 2.

Serranus dermochirus VALENCIENNES, Hist. Nat. Poiss., vol. 6, 1830, p. 513. Coromandel.—GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 23.—DAY, Fishes of India, pt. 1, 1875, p. 2 (Malabar); Fauna Brit. India, vol. 1,

- 1889, p. 453.—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 257 (Padang material).
- Epinephelus dermochirus* FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 524 (Padang).
- Serranus hoevenii* BLEEKER, Verh. Batav. Genootsch. (Perc.), vol. 22, 1849, p. 36. Batavia.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 138 (Amboina).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 9, pl. 2, fig. 3 (Zanzibar and Mombasa).—GÜNTHER, Cruise of Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas).—DAY, Fauna Brit. India, vol. 1, 1889, p. 449.—JATZOW and LENZ, Abh. Senckenberg. Naturf. Ges., vol. 21, 1889, p. 498 (Zanzibar; Majunga, West Madagascar).—BOULENGER, Proc. Zool. Soc. London, 1892, p. 134 (Muscat).—WEBER, Semon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 262 (Amboina).
- Epinephelus hoevenii* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 63, pl. (4) 282, fig. 1, pl. (8) 286, fig. 3, pl. (12) 290, fig. 4 (Sumatra, Nias, Java, Borneo, Bawean, Timor, Sangi, Ternate, Buru, Ceram, Amboina, Goram).
- Serranus kunhardtii* BLEEKER, Nat. Tijds. Nederland. Indië, vol. 2, 1851, p. 169. Padang, west Sumatra.
- Serranus tumilabris* (not VALENCIENNES) DAY, Fishes of India, pt. 1, 1875, p. 16, pl. 3, fig. 3.
- Serranus diacanthus* (not VALENCIENNES) STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, vol. 47, 1883, p. 231 (Tokyo, Nagasaki, Hong Kong).
- Serranus outalibi* (not VALENCIENNES) KENT, Great Barrier Reef, 1893, pp. 281, 369 (Queensland).

Depth $3\frac{1}{8}$ to $3\frac{1}{3}$; head $2\frac{1}{4}$ to $2\frac{1}{3}$, width $2\frac{2}{5}$ to 3. Snout $4\frac{1}{4}$ to 5 in head from snout tip; eye $5\frac{1}{4}$ to $6\frac{1}{5}$, $1\frac{1}{5}$ to $1\frac{2}{5}$ in snout, greater than interorbital; maxillary reaches $\frac{3}{4}$ to or till opposite hind eye edge, expansion $1\frac{1}{4}$ to $1\frac{1}{2}$ in eye, length $2\frac{2}{5}$ to $2\frac{1}{2}$ in head from snout tip; teeth in broad villiform bands in jaws, on vomer and palatines, in mandible about 10 irregular rows which finally narrow to single row posteriorly; no canines; hind nostril greatly larger than front one, especially with age, when its diameter sometimes $\frac{2}{3}$ of pupil; interorbital 8 to 9, nearly level or slightly convex; hind preopercle edge with extremely minute serrae, obsolete with age; opercular spines 3, lower closer to median, uppermost most advanced. Gill rakers 10 + 17, lanceolate, equal gill filaments or $2\frac{1}{4}$ in eye.

Scales 98 to 102 in lateral line to caudal base and 12 to 15 more on latter; tubes 51 to 65 in lateral line to caudal base and 2 or 3 more on latter; 17 or 18 scales above lateral line, 22 below, 85 to 100 predorsal forward to snout end, 31 or 32 rows of scales obliquely over cheek from lower hind eye edge to preopercle angle; many of large scales with numerous minute basal auxiliary scales, often appearing imbedded; fins finely scaled over greater basal portions; maxillary usually naked, sometimes with small patch of small scales terminally above. Scales with 6 to 11 basal radiating striae; 28 to 38 apical denticles, with 7 or 8 transverse series, pressed together, only apparent with age; circuli moderately fine.

D. XI, 15, 1, third spine $3\frac{3}{5}$ to $3\frac{2}{3}$ in total head length, sixth ray $2\frac{3}{4}$ to $2\frac{7}{8}$; A. III, 8, 1, second spine $3\frac{3}{4}$ to $4\frac{1}{2}$, fourth ray $2\frac{2}{5}$ to $2\frac{3}{4}$; caudal $1\frac{4}{5}$ to 2, convex behind; least depth of caudal peduncle $3\frac{7}{8}$ to 4; pectoral $1\frac{3}{4}$ to $1\frac{7}{8}$; ventral $2\frac{1}{4}$ to $2\frac{3}{4}$.

Dark sienna brown, finely spotted grayish to whitish, spots small, close, though variably set and distributed and extending over vertical fins. Adults with large, pale blotches about size of eye, irregular and placed close, numerous, often embracing large number of smaller pale spots. In small or young examples small pale spots usually absent or not numerous and larger white spots relatively smaller, less numerous, also much more contrasted. Blackish brown band very distinct in maxillary groove. Iris brownish. Fins all largely with dusky, especially terminally.

Red Sea, Arabia, Mombasa, Zanzibar, Natal, Mauritius, Réunion, Madagascar, Seychelles, India, Ceylon, East Indies, Philippines, Riu



FIGURE 19.—*SERRANUS CAERULEO-PUNCTATUS* (BLOCH), YOUNG

Kiu, Queensland, Melanesia, Micronesia. We have no examples quite so large as Boulenger's maximum of 560 mm. The species is well distinguished by the blackish streak in the maxillary groove, the white spots and its uniformly fine teeth.

8164. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 405 mm.

8678. Batag Island, west near Leung Point, east coast of Luzon. June 2, 1909.

Length 355 mm.

21852. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 120 mm. (1304.)

5399. Cebu market. April 7, 1908. Length 187 mm.

21766. Cebu market. March 20, 1909. Length 113 mm.

17018. Galvaney Island, Ragay Gulf, Luzon. March 9, 1909. Length 97 mm.

5962. Little Santa Cruz Island. March 26, 1908. Length 283 mm.

8449. Mactan Island, opposite Cebu. March 25, 1909. Length 320 mm.

One example. Mactan Island. August 28, 1909. Length 39 mm.

8061. Mompog Island, vicinity Marinduque. March 3, 1909. Length 283 mm.

9295. Murielagos Bay, Mindanao Island. August 9, 1909. Length 392 mm. Seven examples. Nogas Point, Panay. February 4, 1908. Length 24 to 90 mm. 21580 to 21582. Pilas Island, south of Zamboanga. September 12, 1909. Length 35 to 93 mm. 4 examples.
6560. Port Maricaban, China Sea, vicinity southern Luzon. July 21, 1908. Length 530 mm.
- 11605, 11606. Sablayan, Mindoro Island. December 12, 1908. Length 70 to 123 mm.
22459. Sablayan. December 13, 1908. Length 53 mm.
- 9115, 9127, 9128. San Roque, Leyte Island. July 29, 1909. Length 283 to 508 mm.
- Four examples. Sinalue Island. September 22, 1909. Length 92 to 110 mm. 6620 to 6622. Simalue Sibi Sibi Island, north of Tawi Tawi. September 23, 1909. Length 119 to 151 mm.
7847. Taganak Island, Jolo Sea. January 7, 1909. Length 472 mm.
6451. Tilig Bay, Lubang Island, vicinity southern Luzon. July 15, 1908. Length 490 mm.

SERRANUS SUMMANA (Forskål)

- Perca summana* FORSKÅL, Descript. Animal., 1775, pp. xi, 42. Arabia.—BONNATERRE, Tabl. Ichth., 1788, p. 132 (Red Sea).—GMELIN, Syst. Nat. Linn., vol. 1, 1789, p. 1317 (Arabia).—WALBAUM, Artedi Pisc., vol. 3, 1792, p. 345 (on FORSKÅL).
- Bodianus summana* SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 334 (Red Sea).
- Pomacentrus summana* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, p. 511 (Arabia).
- Serranus summana* RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 104 (note).—LEFEBVRE, Voy. Abyssinie, Zool. vol. 6, 1845, p. 229, pl. 5, fig. 1 (Massuah).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 137 (Red Sea).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 8, pl. 2, fig. 1 (Zanzibar).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 685 (Koseir, Red Sea).—DAY, Fishes of India, pt. 1, 1875, p. 21, pl. 4, fig. 4 (Andamans).—KLUNZINGER, Fische Roth. Meer., 1884, p. 5, pl. 2, figs. 1-2.—DAY, Fauna Brit. India, vol. 1, 1889, p. 453.—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 275 (Philippines); Mem. Bishop Mus., vol. 10, 1928, p. 183 (Rarotonga, Makatea, Society Islands).
- Epinephelus summana* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 61 (Sumatra, Celebes, Buton, Buru, Amboina).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 63.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 248 (Red Sea, Massuah, Zanzibar, Malay Archipelago, Borneo, Java, Manado, North Celebes, Amboina, Ponapé).—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 414 (Ternate).—BORSIERI, Ann. Mus. Civ. Stor. Nat. Genova, ser. 3, vol. 1, 1904, p. 189 (Massaua).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 498 (Okinawa).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 205 (Saleyer, Huingsisi).—BEAUFORT, Bijl. Dierk., Amsterdam, 1913, p. 111 (Saonek, Waigiu).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 27 (Zamboanga).
- Holocentrus oncus* BLOCH, Naturg. Ausländ. Fische, vol. 4, 1790, p. 69, pl. 234. Japan.—WALBAUM, Artedi Pisc., vol. 3, 1792, p. 644 (on BLOCH).—FORSTER, Fauna Indica, 1795, p. 16.—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 314 (Java).—LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 338, 380 (Japan).
- Serranus oncus* PETERS, Monatsb. Akad. Wiss. Berlin, 1865, p. 102 (type).
- Epinephelus oncus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 64 (Sumatra, Duizend Islands, Java, Borneo, Celebes, Amboina).

Serranus reticulatus (Kuhl and Van Hasselt) Valenciennes, Hist. Nat. Poiss., vol. 2, 1828, p. 323. Java.

Serranus reticularis Günther, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 150 (copied).

Serranus tumilabrus Valenciennes, Hist. Nat. Poiss., vol. 2, 1828, p. 346. Seychelles.—Günther, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 139 (no locality).—Playfair, Fishes of Zanzibar, 1866, p. 8, pl. 2, fig. 1 (Aden).—Thurston, Notes Pearl Fisher. Manaar, 1890, p. 91 (Tuticorin).

Serranus alboguttatus Valenciennes, Hist. Nat. Poiss., vol. 2, 1828, p. 366. Sea of the Indies.—Günther, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 129 (Amboyna).

Epinephelus alboguttatus Bleeker, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (6) 284, fig. 1.

Serranus bataviensis Bleeker, Verh. Batav. Genootsch. (Percoid.), vol. 22, 1849, p. 38. Batavia.—Günther, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 129 (Amboyna).—Bleeker, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (4) 282, fig. 2.—Meyer, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 16, 1885, p. 9 (Manado, Celebes).

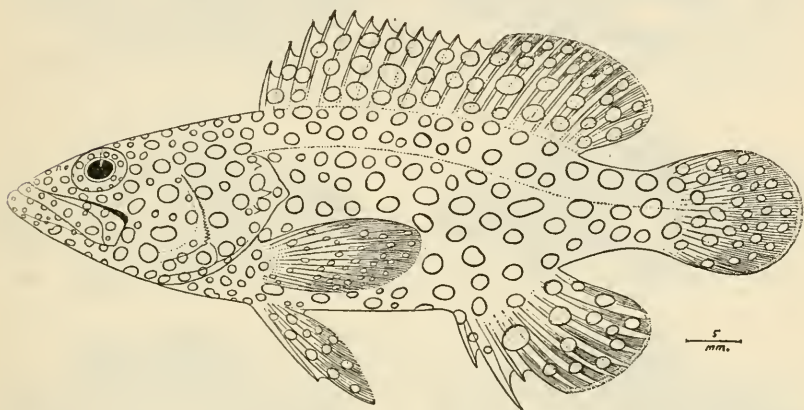


FIGURE 20.—*SERRANUS SUMMANA* (FORSKÅL), YOUNG

Serranus polystigma Bleeker, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 244. Beneulen, Sumatra.—Günther, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 129 (copied).

Epinephelus polystigma Bleeker, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (7) 285, fig. 4.

?*Serranus flavoguttatus* Peters, Arch. Naturg., 1855, p. 235. Mozambique.

Epinephelus caeruleopunctatus (part) Bleeker, Atlas Ichth. Ind. Néerland., vol. 7, 1876, p. 62.

Depth $2\frac{1}{2}$ to $3\frac{1}{2}$; head $2\frac{2}{5}$ to $2\frac{1}{2}$, width $2\frac{1}{5}$ to $2\frac{2}{5}$. Snout $3\frac{1}{5}$ to 5 in head from snout tip; eye $4\frac{1}{4}$ to $5\frac{1}{10}$, 1 to $1\frac{1}{10}$ in snout, greater than interorbital; maxillary reaches opposite hind eye edge, expansion $1\frac{1}{3}$ to $1\frac{3}{4}$ in eye, length $2\frac{1}{8}$ to $2\frac{1}{4}$ in head from snout tip; teeth in rather broad bands, mandibulars in 5 rows anteriorly, narrowing to 3 and finally 2 rows; pair of canines in front of each jaw, often double; moderate bands of fine teeth on vomer and palatines;

interorbital 7 to $9\frac{1}{5}$, nearly level; hind preopercle edge with very minute serrae; opercular spines 3, median nearer lower. Gill rakers $9+15$, rather clavate, little less than gill filaments or $\frac{1}{3}$ of eye; 8 above and 5 below rudimentary.

Scales 96 to 98 in lateral line to caudal base and 15 to 18 more on latter; tubes 33 to 38 in lateral line to caudal base and 4 or 5 more on latter; 14 to 16 scales above lateral line, 33 to 38 below, 60 to 87 predorsal, 25 to 33 rows across cheek; body scales all with numerous fine basal auxiliary scales; fins all more or less finely scaled basally; maxillary naked or with small patch of scales on expansion above. Scales with 7 to 9 basal radiating striae; 27 to 35 apical denticles, with 5 to 6 transverse series; circuli fine.

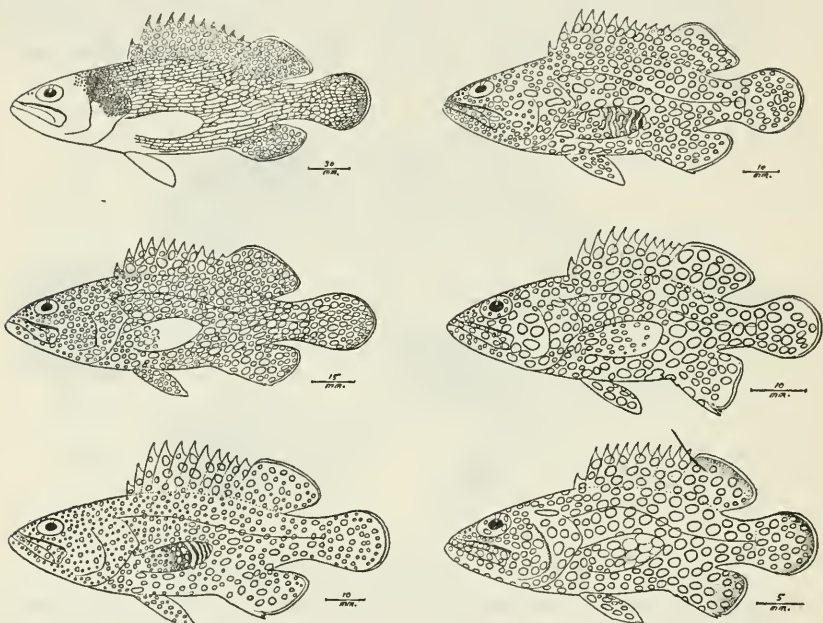


FIGURE 21.—*SERRANUS SUMMANA* (FORSKÅL), VARIATION

D. XI, 15, 1 or 14, 1, third spine $2\frac{5}{10}$ to 3 in total head length, first ray $2\frac{4}{5}$ to 3; A. III, 8, 1, second spine $3\frac{1}{3}$ to 4, fourth ray $2\frac{1}{4}$ to $2\frac{1}{3}$; caudal $1\frac{3}{4}$ to 2, convex behind; least depth of caudal peduncle $3\frac{2}{3}$ to $3\frac{3}{4}$; pectoral $1\frac{3}{5}$ to $1\frac{3}{4}$; ventral 2 to $2\frac{2}{5}$.

Body brown, marked with numerous small, grayish white spots, rounded and on head, back, sides and tail usually formed as slightly undulated and often slightly inclined series of pale streaks, very variable. Often large pale blotches present. All vertical fins and ventral basally, often pectoral less conspicuously, finely spotted with gray white; especially contrasted on soft vertical fins, which darker or dusky subterminally and with narrow whitish edges. Iris yellowish. Dusky or blackish streak in groove of maxillary.

Red Sea, Arabia, Zanzibar, Mozambique, Madagascar, Seychelles, India, East Indies, Philippines, Riu Kiu, Japan, Micronesia, Polynesia. Reaches 330 mm. according to Boulenger. Besides the dark streak in the maxillary groove the body is marked with multitudinous small, crowded, whitish spots or dots.

8137. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 250 mm.
 17755. Balikias Bay, Lubang Island. July 17, 1908. Length 180 mm.
 8869. Buang Bay, Talajit Island. March 15, 1909. Length 176 mm.
 18726. Butauanan Island, east coast Luzon. June 13, 1909. Length 150 mm.
 5886. Calangaman Island, between Leyte and Cebu. March 16, 1909. Length 226 mm.
 15055, 15273. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 193 to 210 mm.
 8029. Capulaan Bay, Pagbilao, Chica Island, vicinity Marinduque. February 24, 1909. Length 251 mm.
 9330. Catbalogan, Samar. April 15, 1908. Length 83 mm. (539).
 One example. Cebu market. March 22, 1909. Length 55 mm.
 5370. Cebu market. April 5, 1908. Length 220 mm.
 11340, 11341. Cebu market. April 4, 1908. Length 120 to 136 mm. (501, 500).
 Two examples. Cebu market. August 26, 1909. Length 49 to 59 mm.
 9254, 9255. Endeavor Strait, Palawan. December 22, 1908. Length 215 to 225 mm.
 16638. Galera Bay, Mindoro. June 9, 1908. Length 226 mm.
 6813, 7388, 9106, 9108. Gigoso Point, Quinapundan Bay, Samar Island. July 28, 1909. Length 150 to 265 mm.
 5167. Jolo market. March 6, 1908. Length 265 mm.
 22055, 22056. Langao Point, Luzon. June 24, 1909. Length 65 to 84 mm.
 16002. Mactan Cove, Mactan Island, off northern Cebu. April 6, 1908. Length 89 mm.
 11239. Mactan Island, Cebu. March 25, 1909. Length 175 mm.
 One example. Mactan Island. August 31, 1909. Length 71 mm.
 7233. Masinloc Bay, Zambales, off western Luzon. November 22, 1908. Length 295 mm.
 6245, 6264, 6265. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 250 to 300 mm.
 (17632). Mompog Island, Anabayas Islands. March 3, 1909. Length 205 mm.
 17280. Nabatas Point, Samar Island. July 24, 1909. Length 167 mm.
 8875. Near Palag Bay, Luzon. June 16, 1909. Length 280 mm.
 21567, 21568. Northwest Verde Island. July 22, 1908. Length 93 to 115 mm.
 One example. Oyster Inlet, Ulugan Bay. December 28, 1908. Length 92 mm.
 7979, 12467. Pagapas Bay, Luzon. February 20, 1909. Length 188 to 303 mm.
 One example. Philippines. Length 200 mm. (107).
 5902. Polloc, Mindanao Island. May 22, 1908. Length 225 mm. Brown, abundantly spotted above and on verticals pale. Spots fusing on lower side into irregular stripes. Lower head and breast without spots, paler than upper parts. Margin of soft vertical fins almost white, nearly black submarginally.
 6554, 6574, 10482, 21145. Port Maricaban, southern Luzon. July 21, 1908. Length 91 to 272 mm.
 13373. Port Matalvi, Luzon. November 23, 1908. Length 188 mm.
 18629. Saboon Island, Ragay Gulf, Luzon. March 10, 1909. Length 182 mm.
 5687. Santa Cruz, Marinduque. April 24, 1908. Length 269 mm.

21882. Singaan Island, between Jolo and Tawi Tawi Group. September 21, 1909. Length 81 mm.
10887. Tilig, Lubang. July 15, 1908. Length 160 mm.
8691. Tutu Bay, Jolo Island. September 19, 1909. Length 67 mm.
229. Ulugan Bay, Palawan Island. December 29, 1908. Length 90 mm. (987).
- 6634, 9249. Varadero Bay, Mindoro. July 23, 1908. Length 230 to 305 mm.
20469. Danawan and Si Amil Islands, vicinity Darvel Bay, Borneo. September 27, 1909. Length 96 mm.
19888. Daisy Island, west of Bumbum, Trusan Tando Bulong, British North Borneo. January 6, 1910. Length 121 mm.
867. Limbe Strait, Celebes, Dutch East Indies. November 10, 1909. Length 328 mm.
13660. Sadaa Island, Gulf of Tomini, Celebes. November 17, 1909. Length 191 mm.
- 831, 21524. Talisse Island, north of Celebes. November 9, 1909. Length 45 to 297 mm.
- 13057, 21197. Gomomo Island, Pitt Passage. December 3, 1909. Length 65 to 130 mm.

SERRANUS FUSCO-GUTTATUS (Forskål)

- Perca summana fusco-guttata* FORSKÅL, Descript. Animal., 1775, pp. xi, 42. Suerens, Djedda.—GMELIN, Syst. Nat. Linn., vol. 1, 1789, p. 1317 (Arabia).
- Serranus fuscoguttatus* RÜPPELL, Atlas Reis. nördl. Afrika, Fische, 1828, p. 108, pl. 27, fig. 2 (Red Sea).—PETERS, Arch. Naturg., 1855, p. 235 (Mozambique).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 127 (Port Essington).—KNER, Reise Novara, Zool., vol. 1, pt. 5, 1865, p. 22 (Australia).—GUICHENOT, Mem. Soc. Hist. Nat. Cherbourg, ser. 2, vol. 2, 1866, p. 148 (Madagascar).—MARTENS, Verh. zool. bot. Ges. Wien, vol. 16, 1866, p. 378 (Musa Elei, Red Sea).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 5 (Zanzibar).—GÜNTHER, Ann. Mag. Nat. Hist., ser. 3, vol. 20, 1867, p. 57 (East Africa, Hope Islands, Port Essington, Port Denison, Cape York).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 684 (Koseir, Red Sea).—DAY, Fishes of India, pt. 1, 1875, p. 22, pl. 5, fig. 3 (Sind).—ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 264 (Cape Grenville, Queensland).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 149 (Yokohama).—KLUNZINGER, Fische Roth. Meer., 1884, p. 4.—DAY, Fauna Brit. India, vol. 1, 1889, p. 454.—PEARSON, Rep. Gov. Marine Biol. Ceylon, 1912-13, pt. 4, p. E13 (between Chilaw and Ceylon); 1914, p. E2 (between Talawilla and Chilaw).—FOWLER, Bishop Mus. Bull., No. 38, 1927, p. 14 (Fanning Islands); Mem. Bishop Mus., vol. 10, 1928, p. 183, pl. 15, fig. A (Palmyra, Ponapé, Gilbert Islands, Ebon Island, Makemo).
- Epinephelus fuscoguttatus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 57, pl. (29) 307, fig. 3 (Singapore, Java, Bawean, Timor, Ternate, Waigiu).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 249 (Mauritius, Zanzibar, Seychelles, Borneo, Philippines, Hope Island, Tongatabu, Samoa, Greenwich Island, Meduro).—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 413 (Ternate).—JORDAN and EVERMANN, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 341 (Formosa).—REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, 1905, p. 329 (Persian Gulf).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 259 (Apia).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 206 (Salonakie, Saleyer Huingsisi).—REGAN, Ann. Durban Mus., vol. 2, 1917-20, p. 197 (Durban, Natal).—FOWLER and

BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 28 (Cebu).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 485 (Natal coast, Delagoa Bay).

Serranus horridus (KUHL and VAN HASSELT) VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 321. Java.—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 257 (Padang material).

Epinephelus horridus FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 524 (Padang).

Serranus taeniocheirus VALENCIENNES, Hist. Nat. Poiss., vol. 6, 1830, p. 518. No locality (on GAIMARD).

Serranus lutra VALENCIENNES, Hist. Nat. Poiss., vol. 8, 1831, p. 474. Mauritius.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 126 (copied).

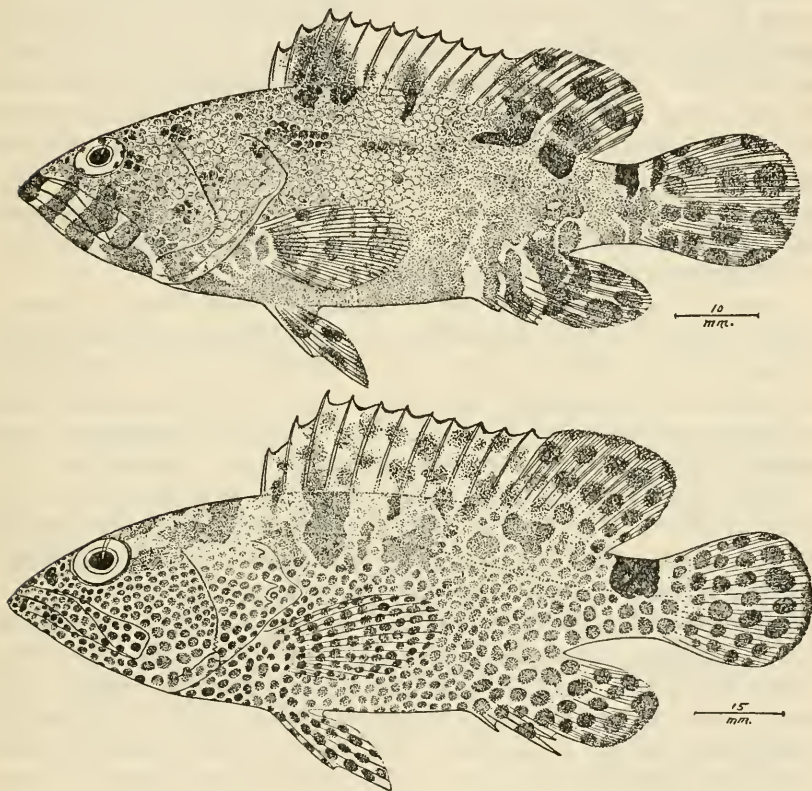


FIGURE 22.—*SERRANUS FUSCO-GUTTATUS* (FORSKÅL), YOUNG

Epinephelus lutra SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 70, pl. 7, fig. 3.

Serranus lebretonianus HOMBRON and JACQUINOT, Voy. Astrolabe, Zool., vol. 3, 1853, p. 33, pl. 1, fig. 3. No locality.

Serranus goliath PETERS, Arch. Naturg., 1855, p. 237. Mossimboa, Mozambique.

Serranus microdon BLEEKER, Nat. Tijds. Nederland. Indië, vol. 11, 1856, p. 86. Batavia.

Epinephelus microdon BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 57, pl. (3) 281, fig. 3 (Batavia).

Serranus hexagonatus var. *merri* (part) GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 141.

Sebastes meleagris PETERS, Arch. Naturg., 1865, p. 392.

Serranus dispar PLAYFAIR, Fishes of Zanzibar, 1866, p. 6, pl. 1, figs. 2-3. Seychelles and Zanzibar.—GÜNTHER, Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 9 (Marshall Group).—CASTELNAU, Proc. Linn. Soc. New South Wales, vol. 3, 1878, p. (349) 365 (Port Jackson).

Depth $2\frac{7}{8}$ to 3; head $2\frac{1}{4}$ to $2\frac{1}{3}$, width $2\frac{1}{2}$ to $2\frac{3}{8}$. Snout $4\frac{1}{2}$ to 5 in head from snout tip; eye $5\frac{3}{4}$ to $7\frac{7}{8}$, $1\frac{2}{5}$ to $1\frac{4}{5}$ in snout, little greater than interorbital in young; maxillary reaches eye diameter beyond eye, expansion 1 to $1\frac{1}{5}$ in eye, length 2 to $2\frac{1}{5}$ in head from snout tip; teeth fine, outer row in each jaw moderate; along sides of mandible 2 inner rows of depressible teeth, innermost row longest; small teeth on vomer and palatines; hind nostril greatly enlarged at all ages, large as pupil; interorbital $6\frac{1}{2}$ to $7\frac{1}{8}$ in head from snout tip, very slightly convex; preopercle edge finely serrated, without spines at angle; 2 opercular spines, lower little advanced, if third upper present usually obsolete. Gill rakers 13+17, all short truncate, with coarse prickles, shorter than gill filaments, which $\frac{3}{5}$ of eye; 8 or 9 above and below rudimentary.

Scales 75 to 90 in lateral line to caudal base and 10 to 13 more on latter; tubes 58 to 62 in lateral line to caudal base and 10 to 12 more on latter; 15 to 22 scales above, 27 to 32 below, 75 to 78 predorsal, 35 to 37 rows across cheek to preopercle edge; scales smooth, small or minute on head and fins; maxillary with $\frac{3}{4}$ of expansion finely scaled. Scales with 8 to 16 basal radiating striae; circuli fine.

D. XI, 14, 1 or 15, 1, third spine $3\frac{1}{4}$ to $3\frac{1}{2}$ in total head length, fifth ray $2\frac{2}{5}$ to $2\frac{4}{5}$; A. III, 8, 1, third spine $4\frac{1}{2}$ to $5\frac{1}{4}$, fifth ray $2\frac{4}{5}$ to $2\frac{7}{8}$; caudal 2 to $2\frac{1}{8}$, rounded; least depth of caudal peduncle $3\frac{1}{3}$ to $3\frac{1}{2}$; pectoral $1\frac{7}{8}$ to $2\frac{1}{8}$; ventral $2\frac{1}{8}$ to $2\frac{2}{5}$.

Brown, with large darker spots, blotches and markings or marblings. Indistinct dusky streak across opercle above. Jaws with three broad dusky transverse bands. Indistinct broken blackish streaks along back, more or less broken into reticulations. Five large blackish saddle-like blotches across back, first four at bases of dorsal fins and last deeply colored on caudal peduncle above. Indistinct broad transverse bands across haemal region. Lower surface of body more or less marbled and with some paler markings than upper surface. Inside gill opening brownish. Iris brownish green. Marginal portions of vertical fins dusky or blackish. Markings on spinous dorsal diffuse and indistinct, other fins with rather large spots of blackish brown, paler basally and in transverse series on caudal. Paired fins spotted, also in more or less transverse series, with pale and whitish reticulated lines between.

Red Sea, Persian Gulf, Zanzibar, Mozambique, Natal, Mauritius, Madagascar, Seychelles, India, Ceylon, East Indies, Philippines, For-

mosa, China, Japan, Queensland, Micronesia, Polynesia. The species is very variable in coloration. Some specimens are finely spotted with dark brown all over the lower surface of the head and body. According to Boulenger reaches 900 mm. Our materials seem to show two fairly constant variations of color. In the first the throat is with cross bars, the dark blotch on the caudal peduncle small and the spots on the body relatively small. The second variation is without cross bars, spot on caudal peduncle very large and spots on body large and hexagonal. As evidences of intergradation occur we have not attempted to list this material according to color variations.

8079. Burias Island. March 5, 1909. Length 541 mm.
 5670. Busin Harbor, Burias Island. April 23, 1908. Length 246 mm.
 8801. Butaanan Island, east coast of Luzon. June 12, 1909. Length 317 mm.
 17178. Butaanan Island. June 13, 1909. Length 232 mm.
 5368. Cebu market, Cebu. April 5, 1908. Length 222 mm.
 5430. Cebu market. April 7, 1908. Length 237 mm.
 A1529. Doc Can Island, Sulu Sea. January 7, 1910. Length 367 mm.
 7531, 7533, 7587. Endeavor Strait, Palawan Island. December 23, 1908. Length 273 to 387 mm.
 21588. Guinayan Island, east coast of Luzon. June 4, 1909. Length 150 mm.
 A474. Isabel, Basilan Island, south of Zamboanga. September 11, 1909. Length 287 mm.
 4841. Jolo market. February 12, 1908. Length 267 mm.
 22374. Maculabo Island, east coast of Luzon. June 14, 1909. Length 87 mm. (1662).
 16914. Makesi Island, Palawan. April 5, 1909. Length 131 mm.
 8600. Matnog Bay, east coast of Luzon. May 31, 1909. Length 390 mm.
 6266. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 285 mm.
 8060. Mompog Island, Anabayas Islands. March 3, 1909. Length 390 mm.
 9031, 9032. Nabatas Point, Samar Island. July 24, 1909. Length 294 to 380 mm.
 5283. Romblon Harbor. March 25, 1908. Length 172 mm.
 7313. Sablayan Bay, Mindoro Island. December 12, 1908. Length 427 mm.
 21912. Sirinao Island, reef, Nakoda Bay, Palawan Island. December 31, 1908. Length 184 mm.
 4948. Tataan, Tawi Tawi Group. February 20, 1908. Length 268 mm.
 4952. Tataan. February 21, 1908. Length 351 mm.
 228. Ulugan Bay, Palawan Island. December 29, 1908. (989.) Length 175 mm.
 A695. Si Amil Islands, vicinity of Darvel Bay, Borneo. September 26, 1909. Length 425 mm.
 A1076. Maitara Island, Dodinga Bay, Gillolo Island. November 26, 1909. Length 450 mm.

SERRANUS TAUVINA (Forskål)

Perca tawina FORSKÅL, Descript. Animal., 1775, pp. xi, 39. Djedda, Red Sea.—BONNATERRE, Tabl. Ichth., 1788, p. 131 (Red Sea).—GMELIN, Syst. Nat. Linn., vol. 1, 1789, p. 1316 (Arabia).—WALBAUM, Artedi Pisc., vol. 3, 1792, p. 340 (on FORSKÅL).

Holocentrus tauvinus SÜCKOW, Naturg., vol. 4, 1799, p. 523 (Arabia).—LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 338, 380 (Arabia).

Holocentrus tawina SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 321 (Arabia).

Serranus tauvina KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 28, 1870, p. 683 (Koseir, Red Sea); Fische Roth. Meer., 1884, p. 6, pl. 1, fig. 3. — FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 225 (Durban Bay); 1927, p. 275 (Orion, Philippines).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 71, 1927, p. 6 (Benkoelen, Sumatra).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 182, fig. 42 (Palmyra; type of *Serranus phaeostigmaeus*).

Serranus (Epinephelus) tauvina ZUGMAYER, Abh. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, pt. 6, 1913, p. 10 (Oman).

Epinephelus tuavina BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 244 (Red Sea, Zanzibar, Natal, Muscat, Fao, Ceylon, Madras, Vizagapatam, Bengal, Singapore, Malay Archipelago, Borneo, Formosa, Amoy, China, Ponapé, North Celebes, Amboina, Pelew Islands, Port Essington, Port Denison, Port Bowen, Java).—JORDAN and EVERMANN, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 341 (Keerun, Formosa).—PELLEGRIN, Bull. Soc. Zool. France, vol. 30, 1905, p. 85 (Tonkin).—REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, 1905, p. 329 (Persian Gulf).—JORDAN and SEALE, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 781 (Negros); Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 20 (Cavite).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 75 (Bacon).—SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 242 (Zamboanga).—REGAN, Ann. Natal Mus., vol. 1, pt. 3, 1908, p. 244 (Congella).—JORDAN and RICHARDSON, Mem. Carnegie Mus., vol. 6, No. 4, 1909, p. 183 (Takao).—GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol. 6, 1908–10, p. 220 (Natal).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 498 (Okinawa).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 205 (Haingsisi, Makasser).—REGAN, Ann. Durban Mus., vol. 1, 1914–17, p. 167 (Durban).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 484 (Natal coast).

Serranus micronotatus RÜPPELL, Neue Wirbelth., Fische, 1835, p. 90. Massauah, Red Sea.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 137 (copied).—KLUNZINGER, Verh. zool. bot. Ges. Wien., vol. 20, 1870, p. 685 (Red Sea).

Serranus summana var. *micronotatus* KOSSMAN and RÄUBER, Zool. Ergebn. Reise Roth. Meer., 1877, p. 7 (Red Sea).

Epinephelus micronotatus BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 246 (copied).

Serranus abdominalis PETERS, Arch. Naturg., 1855, p. 237. Mozambique.

Serranus chabaudi CASTELNAU, Mem. Poiss. Afrique Australe, 1861, p. 3. Mouth of Zwartkops River.

Homalagrystes guntheri ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 269, pl. 9, fig. 3. About 12 miles south of New Guinea coast at Katow.

Serranus estuarius MACLEAY, Proc. Linn. Soc. New South Wales, vol. 8, 1883, p. 200. Mary River, Queensland.

Epinephelus estuarius OGILBY, Ann. Queensland Mus., No. 1, 1911, p. 50 (Mary River).

Serranus phaeostigmaeus FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 255, fig. 2. Hawaiian Islands.

Depth $3\frac{1}{8}$ to $3\frac{5}{8}$; head $2\frac{1}{3}$ to $2\frac{1}{2}$, width $2\frac{1}{5}$ to $2\frac{1}{4}$. Snout $4\frac{1}{5}$ to $4\frac{1}{2}$ in head from snout tip; eye $5\frac{2}{5}$ to $7\frac{2}{5}$, $1\frac{1}{5}$ to $1\frac{3}{4}$ in snout, greater than interorbital in young to $1\frac{1}{3}$ in interorbital with age; maxillary extends well beyond eye, expansion $1\frac{1}{4}$ to $1\frac{2}{3}$, length $2\frac{1}{8}$

to $2\frac{1}{6}$ in head from snout tip; teeth in narrow bands in jaws in young, triserial in front of mandible but becoming biserial laterally, though in young largely biserial; pair of small canines in front of each jaw; band of fine teeth on vomer and each palatine; hind nostril becomes twice size of front nostril with age, though always much less than pupil; interorbital $4\frac{1}{8}$ to $6\frac{3}{4}$ in head from snout tip, level; hind preopercle edge denticulate; median opercular spine nearer lower, which anterior and most advanced. Gill rakers 10+15, lanceolate, equal gill filaments or $1\frac{3}{5}$ in eye; 8 above and 5 below rudimentary.

Scales 84 to 108 in lateral line to caudal base and 11 to 15 on latter; tubes 57 to 60 in lateral line to caudal base and 4 or 5 more on latter; 17 to 19 scales above lateral line, 28 or 29 below, 66 to 70 predorsal, 36 to 38 rows across cheek; body scales with numerous, fine, basal, auxiliary scales, and fins all finely scaled basally; upper half of maxillary expansion finely scaled. Scales with 5 or 6 basal radiating striae; 10 to 25 apical denticles with 11 or 12 transverse series; circuli fine.

D. XI, 15, 1 or 16, 1, fourth spine 3 to $3\frac{3}{4}$ in total head length, first ray $2\frac{1}{2}$ to $3\frac{1}{5}$; A. III, 8, 1, second spine $3\frac{2}{5}$ to $6\frac{2}{5}$, fourth ray $2\frac{1}{8}$ to $2\frac{1}{2}$; caudal $1\frac{2}{3}$ to $1\frac{4}{5}$, convex behind; least depth of caudal peduncle $3\frac{3}{5}$ to $3\frac{3}{4}$; pectoral $1\frac{4}{5}$ to 2; ventral $2\frac{1}{10}$ to $2\frac{1}{3}$.

Brown, little paler on belly and lower surfaces. Back with six obscure darker band-like blotches. Body, head, and fins with well-spaced blackish spots, variably distributed, but always smaller on fins. Spots more sparse in young, increase with age.

Indo-Pacific from the Red Sea and East Africa to the East Indies, Philippines, China, Queensland, Melanesia, Polynesia, and Hawaii. According to Boulenger reaches 1270 mm. We have retained Forskål's name *Perca tauvina* for the form usually with fine dark spots on the fins, numerous and greatly smaller than in *Serranus malabaricus*.

8080. Burias Island. March 5, 1909. Length 425 mm.

22871. Davao, Mindanao. May 16, 1908. Length 128 mm.

6953. Iloilo market. May 31, 1908. Length 211 mm.

6299, 20649. Manila market. June 13, 1908. Length 149 to 315 mm.

6304, 10625 to 10627. Manila market. June 17, 1908. Length 114 to 384 mm.

12409, 12411. Manila market. June 25, 1908. Length 118 to 173 mm.

SERRANUS MALABARICUS (Schneider)

Holocentrus malabaricus SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 319, pl. 63. Tranquebar.

Serranus malabaricus DAY, Fishes of India, pt. 1, 1875, p. 19, pl. 4, fig. 2.—PEARSON, Rep. Marine Biol. Ceylon, 1912-13, pt. 4, p. E13 (Cheval Paar Group, North Cheval Paar, between Muttuvaratu and Talavilla).

Epinephelus malabaricus SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 67.—JORDAN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 19 (Cavite).

Holocentrus pantherinus LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 345 389; vol. 3, 1802, pl. 27, fig. 3. No locality (on COMMERSON).

- Serranus pantherinus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1829, p. 333 (Fort Dauphin, Madagascar).—GUICHENOT, Mem. Soc. Hist. Nat. Cherbourg, ser. 2, vol. 2, 1866, p. 145 (Madagascar).—DAY, Fauna Brit. India, vol. 1, 1889, p. 451.—WEBER, Semon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 262 (Thursday Island, Queensland).
- Epinephelus pantherinus* BLEEKER, Nederland. Tijdschr. Dierk., vol. 1, 1863, p. 344 (Madagascar); Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 51 (Sumatra, Pinang, Singapore, Bintang, Banka, Java, Madura, Borneo, Celebes, Timor, Batjan, Amboina, Philippines); Verh. Kon. Akad. Wet. Amsterdam, vol. 14, ser. 2, 1874, p. 78 (Philippines).
- Holocentrus salmoides* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 346, 389; vol. 3, 1802, pl. 34, fig. 3. Grand Ocean (Indo-Pacific).
- Serranus salmoides* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 343 (Mauritius, Seychelles, Red Sea, Suez).—PETERS, Arch. Naturg., 1855, p. 235 (Mozambique).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 128 (Mauritius, Red Sea, India).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 682 (Koseir).—KOSSMANN and RÄUBER, Zool. Ergebn. Reise Roth. Meer., 1877, p. 7 (Red Sea).—KLUNZINGER, Fische Roth. Meer., 1884, p. 5.—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 9 (Rubi, New Guinea).—BOULENGER, Proc. Zool. Soc. London, 1887, p. 237 (Muscat, Arabia).
- Serranus salmoides* DAY, Fishes of India, 1875, p. 20, pl. 4, fig. 3 (Andamans; India); Fauna Brit. India, vol. 1, 1889, p. 452.—THURSTON, Pearl Fisher. Manaar, 1890, p. 91 (Tuticorin).—WEBER, Zool. Jahrb. Syst. Geogr. & Biol., vol. 10, No. 2, 1897, p. 142 (Illovo River mouth, Natal).
- Bola? coioides* BUCHANAN-HAMILTON, Fishes of Ganges, 1822, pp. 82, 369. Large Gangetic estuaries.
- Serranus coioides* CANTOR, Cat. Mayalan Fishes, 1850, p. 11. Pinang Sea; Singapore.
- Serranus maculosus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 332. No locality.
- Serranus bontoo* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 334. Vizagapatam (on *Madinawa bontoo* RUSSELL, Fishes of Coromandel, vol. 2, 1803, p. 22, pl. 128, Vizagapatam and Madras).—CANTOR, Cat. Malayan Fishes, 1850, p. 11 (Pinang Sea).—GÜNTHER, Cat. Fishes Brit. Mus., vol. 1, 1859, p. 138 (Ceylon).—DAY, Fishes of Malabar, 1867, p. 3.—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 149 (Ceylon).
- Serranus suillus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 335. Coromandel.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 129 (Philippines).—PLAYFAIR, Fishes of Zanzibar, 1867, p. 5 (Zanzibar).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 9 (north Celebes).—GORGOZA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 282 (Cebu).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 461 (Cebu).
- Serranus semipunctatus* VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 341. Pondicherry.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 114 (copied).—DAY, Fishes of India, pt. 1, 1875, p. 20 (Pondicherry); Fauna Brit. India, vol. 1, 1889, p. 452.
- Serranus crapao* CUVIER, Hist. Nat. Poiss., vol. 3, 1829, p. 494. Batavia.—RICHARDSON, Ann. Mag. Nat. Hist., vol. 9, 1842, p. 25 (Australia).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 137 (Port Essington).—PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 255 (Singapore).—ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 264 (Long Island in Torres Straits).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 149 (Singapore).

Epinephelus crapao BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (8) 286, fig. 1.—SAUVAGE, Bull. Soc. Philomath. Paris, ser. 7, vol. 5, 1881, p. 104 (Swatow, China).

Serranus diacopeformis BENNETT, Life of Raffles, 1830, p. 686. Sumatra.

Serranus shihpan RICHARDSON, Ichth. China Japan, 1846, p. 231. Canton, China.

Serranus variegatus RICHARDSON, Ichth. China Japan, 1846, p. 231. China Seas, Canton.

Serranus polydodophilus BLEEKER, Verh. Batav. Genootsch. (Perc.), vol. 22, 1849, p. 37. Batavia.—KLUNZINGER, Sitz. Ber. Akad. Wiss. Wien, vol. 80, pt. 1, 1879, p. 334 (Cleveland Bay, Queensland).

Epinephelus polydodophilus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 59, pl. (5) 283, fig. 1 (Java, Singapore, Banka, Celebes, Amboina).

Serranus janseni BLEEKER, Nat. Tijds. Nederland. Indië, vol. 13, 1857, p. 376. Sangi Island.

Epinephelus janseni BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 51, pl. (11) 289, fig. 5 (Sangi Island).

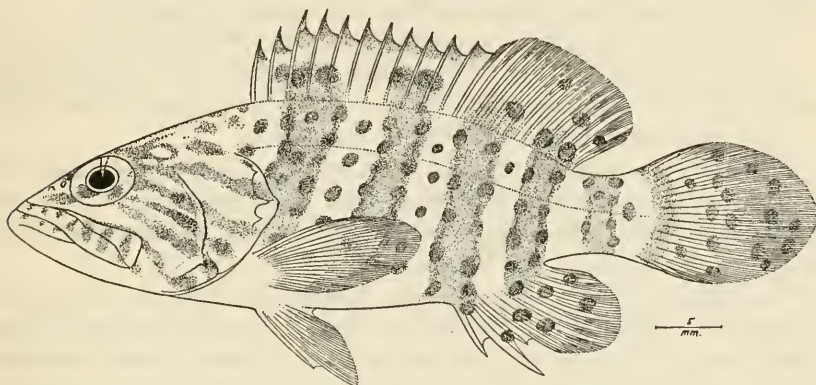


FIGURE 23.—*SERRANUS MALABARICUS* (SCHNEIDER), YOUNG

Serranus diacanthus (part) GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 110.

Serranus gilberti (not RICHARDSON) BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 56; vol. 8, 1876-77, pl. (53) 331, fig. 3.

Serranus multinotatus PETERS, Monatsb. Akad. Wiss. Berlin, 1876, p. 435. Mauritius.

Epinephelus multinotatus BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 246 (copied).

Serranus tawina (not FORSKÅL) FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 182 (part).

Depth $3\frac{1}{4}$ to $3\frac{1}{3}$; head $2\frac{1}{2}$ to $2\frac{3}{8}$, width $2\frac{1}{5}$ to $2\frac{1}{4}$. Snout $4\frac{1}{2}$ to $4\frac{4}{5}$ in head from snout tip; eye $4\frac{1}{5}$ to $6\frac{1}{3}$, $1\frac{1}{3}$ to $1\frac{4}{5}$ in snout, 1 to $1\frac{1}{3}$ in interorbital; maxillary extends little beyond eye, expansion $1\frac{1}{8}$ to $1\frac{2}{5}$ in eye, length $2\frac{1}{10}$ to $2\frac{1}{8}$ in head from snout tip; teeth small, conic, in bands in jaws; pair of upper front canines, outer maxillary teeth slightly larger or more robust than others, inner all hinged with inner front ones largest; pair of lower front canines, little closer than upper, inner teeth longer than outer and hinged,

form 2 rows along each side of jaw; bands of fine teeth on vomer and palatines, none on tongue; nostrils subequal or hind one but little larger than front one; interorbital $5\frac{7}{8}$ to $6\frac{1}{3}$, slightly convex; hind preopercle edge denticulate, serrae obsolete with age, few at angle larger; opercular spines 3, upper most advanced and closer to median. Gill rakers $7+14$, lanceolate, robust, $1\frac{1}{5}$ in gill filaments or $1\frac{2}{3}$ in eye; 4 or 5 above and 4 or 5 below rudimentary.

Scales 98 to 104 in lateral line to caudal base and 14 ? to 16 more on latter; tubes 57 to 59 in lateral line to caudal base and 3 to 5 more on latter; 16 to 18 scales above lateral line, 30 to 33 below, 60 to 80 predorsal forward nearly to snout end, 33 to 40 rows on cheek from lower eye edge to opercle angle; auxiliary minute scales very numerous basal though not crowded densely; fins all finely scaled basally; maxillary expansion with 20 to 23 transverse rows of scales. Scales with 4 to 6 basal radiating striae; 21 to 32 apical denticles, with 7 to 19 transverse series of basal elements; circuli fine.

D. XI, 15, 1 or 14, 1, third spine $3\frac{1}{3}$ to $4\frac{1}{4}$ in total head length, ninth ray $2\frac{1}{4}$ to $2\frac{2}{3}$; A. III, 8, 1, second spine 3 to $4\frac{3}{5}$, fifth ray $2\frac{1}{5}$ to $2\frac{2}{3}$; caudal $1\frac{3}{5}$ to $1\frac{7}{8}$, convex behind; least depth of caudal peduncle $3\frac{2}{3}$ to $3\frac{3}{4}$; pectoral $1\frac{3}{4}$ to $2\frac{1}{8}$; ventral $2\frac{1}{10}$ to $2\frac{2}{5}$.

Brown, below paler or of soiled appearance. Head, body, and fins everywhere with obscure, ill-defined dark blotches, some as spots and irregular or with faded appearance. Fins often darker than body, usually well spotted. Iris brownish.

Red Sea, Zanzibar, Mozambique, Natal, Madagascar, Mauritius, Seychelles, India, Ceylon, Andamans, East Indies, Philippines, China, Queensland. We have admitted this as distinct from *Serranus tauvina*, with which Boulenger unites it. Our examples all show the head, body and fins with large obscure or poorly defined darker brown spots or blotches, though none on the lower surface of the body, as the chest, breast, and belly. The dark saddles or cross bands on the body are indistinct or absent in the adult, though present in the young. The species is very close to *Serranus tauvina*, its soft dorsal rays slightly less, usually 14 or 15, rarely 16.

21079. Abuyog, Leyte Island. July 26, 1909. Length 137 mm.

8873. Basut River, east Luzon. June 15, 1909. Length 268 mm.

5662. Dagupan, Luzon. March 19, 1908. Length 87 mm.

4946. Iloilo market. March 29, 1908. Length 156 mm.

6951. Iloilo market. May 31, 1908. Length 97 mm.

One example. Manila market. April 21, 1909. Length 66 mm.

22470. Manila market. May 2, 1908. Length 100 mm.

5704. Manila market. May 4, 1908. Length 425 mm.

7761. Manila market. June 17, 1908. Length 183 mm.

10628. Manila market. June 17, 1908. Length 166 mm.

12410. Manila market. June 25, 1908. Length 150 mm.

7624. Mouth of Malampaya River, Malampaya Sound, Palawan Island. December 26, 1908. Length 390 mm.

21999. Near mouth of Tayabas River, Luzon. February 25, 1909. Length 88 mm.
19465. Ragay River tidal, Ragay Gulf, Luzon. March 10, 1909. Length 97 mm.
- 14972, 14978. Refugio Island, Pasacao, Luzon. March 9, 1909. Length 59 to 100 mm. (1265, 1264). Olive with light brown red spots, lower surface paler. Smaller example with five downward and forward directed dusky bars, equal to interspaces; first passes through pectoral base and last across caudal peduncle. Dusky stripe in front of cheek under flap of maxillary. Spots of side of head behind eye and below almost form stripes in younger. Fins with lemon yellow shades on soft portion, spots blackish. Pectoral spotted only on base and on upper rays; none in smaller example. Ventrals immaculate.
- 19448, 22326. River at Pasacao, Luzon. March 9, 1909. Length 88 to 101 mm.
6317. San Roque market. June 27, 1908. Length 217 mm.
8297. Sorsogon market, Luzon. March 12, 1909. Length 437.
5475. Tacloban market, Leyte. April 12, 1908. Length 312 mm.
7679. Ulugan Bay, Palawan. December 28, 1908. Length 278 mm.
7820. Ulugan Bay near Baheli River mouth, Palawan. December 28, 1908. Length 77 mm.
- 6083, 6084. Zamboanga market. May 29, 1908. Length 278 to 322 mm.
6846. Kowloon market, China. October 21, 1908. Length 233 mm.

Genus ANYPERODON Günther

Anyperodon GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 95. Type *Serranus leucogrammicus* VALENCIENNES, monotypic.

Anhyperodon BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 269. Type *Serranus leucogrammicus* VALENCIENNES.

Body compressed, elongate. Eye small. Mouth large, protractile. Maxillary exposed, with supplemental bone. Teeth in jaws in broad villiform bands, inner movable, depressible, hinged at bases; small upper front canines present; teeth on vomer but none on palatines or tongue. Opercle with 3 spines. Preopercle edge finely serrated. Gill membranes separate. Gill rakers long. Pseudobranchiae present. Branchiostegals 7. Scales very small, ctenoid. Head entirely scaly. Lateral line complete, tubes straight or directed upward. Vertebrae 24, of which 14 caudal. Dorsal with 11 spines and 14 or 15 rays. Anal short, spines 3, rays 8 or 9. Caudal rounded. Pectoral symmetrical, rounded, rays 16 or 17. Ventral below pectoral, fins close together, spine strong.

Indian Ocean and western Pacific Ocean.

ANYPERODON LEUCOGRAMMICUS (Valenciennes)

Serranus leucogrammicus (REINWARDT) VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 347. Moluccas and Seychelles.

Anyperodon leucogrammicus GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 96 (Amboina).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 1 (Zanzibar and Seychelles); Proc. Zool. Soc. London, 1867, p. 846 (Seychelles).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 28 (Singapore, Java, Flores, Timor, Ternate, Amboina).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 83, pl. 7, fig. 4.—WEBER, Siboga Exp., vol. 57, Fische

- 1913, p. 207 (Gisser Island and Banda).—BEAUFORT, Bijd. Dierk., Amsterdam, 1913, p. 112 (Amboina).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 184 (Apia and Funafuti).
- Anhyperodon leucogrammicus* BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 270 (Seychelles, North Celebes, Amboina, Ponapé, Anciteum, Zanzibar).
- Epinephelus leucogrammicus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (1) 279, fig. 4.
- Serranus urophthalmus* BLEEKER, Nat. Tijds. Nederland. Indië, vol. 8, 1855, p. 310. Batu Archipelago.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 155 (copied).
- Epinephelus urophthalmus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, pl. (12) 290, fig. 3.
- Anyperodon urophthalmus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 29 (Batu).
- Anhyperodon urophthalmus* BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 271 (copied).

Depth $3\frac{1}{8}$ to $3\frac{1}{2}$; head $2\frac{1}{4}$ to $2\frac{1}{3}$, width $3\frac{1}{2}$ to $3\frac{4}{5}$. Snout $3\frac{3}{4}$ to 4 in head from snout tip; eye 5 to 7, $1\frac{1}{4}$ to $1\frac{7}{8}$ in snout, much greater than interorbital; maxillary reaches to hind eye edge in young and little beyond with age, expansion 1 to $1\frac{1}{2}$ in eye, length 2 to $2\frac{1}{8}$ in head; teeth fine, villiform, in bands in jaws, in mandible 4 rows anteriorly narrowing to 2 rows posteriorly; pair of small upper front canines, sometimes double, but no lower ones; band of fine teeth on vomer, none on palatines; interorbital $7\frac{1}{5}$ to $8\frac{1}{2}$, little convex; hind preopercle edge entire, also lower edge entire; 3 small equidistant opercular spines, upper slightly advanced. Gill rakers 7+17, lanceolate, equal gill filaments or $\frac{1}{2}$ of eye; upper and lower 6 or 7 rudimentary.

Scales 82 to 110 in lateral line to caudal base and 14 to 16 more on latter; pores 57 to 61 in lateral line to caudal base and 5 to 7 more on latter; 15 to 20 scales above lateral line, 30 to 37 below, 80 to 90 predorsal, 28 to 33 rows across cheek; maxillary with upper three-fourths of expansion finely scaled; fine basal scales on all fins; body scales largely without auxiliary small basal scales. Scales with 4 to 15 basal radiating striae; 26 to 32 apical denticles with 3 to 6 transverse series basally; circuli fine.

D. XI, 14, 1 or 15, 1, third spine 3 to $3\frac{3}{4}$ in total head length, eleventh ray $2\frac{2}{3}$ to $3\frac{1}{3}$; A. III, 9, 1, third spine $3\frac{1}{4}$ to $4\frac{1}{4}$, fourth ray $2\frac{1}{3}$ to $2\frac{7}{8}$; caudal $1\frac{3}{4}$ to $1\frac{7}{8}$, rounded behind; least depth of caudal peduncle 4 to $4\frac{1}{4}$; pectoral $2\frac{1}{8}$ to $2\frac{1}{5}$; ventral 2 to $2\frac{3}{5}$.

In alcohol brown or little lighter on under surface of head and abdomen. Usually spotted or blotched obscurely with darker. Four pale grayish to whitish longitudinal or horizontal lines, narrow, variously broken or incomplete and at least distinct at all ages. Fins pale brownish, uniform or soft verticals spotted obscurely with darker. In young spinous dorsal with broad median and terminal row of

darker or dusky blotches, less defined with age. Pectoral pale olivaceous. Ventral deep brown, especially terminally and outer or front edge pale to whitish.

Zanzibar, Madagascar, Seychelles, East Indies, Philippines, Melanesia, Micronesia. Though none of our examples so large as Boulenger gives (520 mm.), they all show the whitish horizontal lines distinct at all ages. The lower front edge of the soft anal is also dusky, likewise upper front edge of the soft dorsal in small specimens. The species is well marked and easily distinguished among the numerous members of the family by its unusual coloration together with its very slender pointed head, due in large measure to the greatly pointed and protruded mandible. Two examples, 22161 and 14938, are referable to *Anyperodon urophthalmus* as admitted by Boulenger.

8138. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 362 mm.
11295, 16008. Alimango Bay, Burias Island. March 5, 1909. Length 138 to 140 mm.

15265. Atulayan Island, eastern Luzon. June 18, 1909. Length 200 mm.

6512. Balikias Bay, southern Luzon. July 17, 1908. Length 253 mm.

7464. Bolalo Bay, Palawan Island. December 21, 1908. Length 336 mm.

8083. Burias Island. March 5, 1909. Length 340 mm.

7255. Busbus Point, Siasi Island. September 20, 1909. Length 152 mm.

7195. Busin Harbor, Burias Island. March 8, 1909. Length 233 mm.

11068. Butaanan Island, east Luzon. June 13, 1909. Length 138 mm.

7858. Cagayan de Jolo, Jolo Sea. January 8, 1909. Length 282 mm.

7599. Endeavor Strait, Palawan Island. December 24, 1908. Length 326 mm.

8232. Galvaney Island, Ragay Gulf, Luzon. March 9, 1909. Length 335 mm.

9483. Guntao Island, Palawan Passage. December 20, 1908. Length 217 mm.

9024. Langao Point, southern Luzon. June 24, 1909. Length 272 mm.

4716. Ligpo point, Balayan Bay, Luzon. January 18, 1908. Length 382 mm.

6040. Little Santa Cruz Island. May 28, 1908. Length 365 mm.

13133. Polloc, Mindanao. May 22, 1908. Length 203 mm.

8013, 12059. Port Banalacan, Marinduque Island. February 23, 1909. Length 217 to 302 mm.

6553, 6566, 6567. Port Maricaban, southern Luzon. July 21, 1908. Length 276 to 393 mm.

(S. 1684). Rapurapu Island. June 22, 1909. Length 68 mm.

8257. Reefs of southern Luzon, Tumindao. February 26, 1908. Length 156 mm.

22503. Romblon. March 26, 1908. Length 102 mm. (S. 471).

14780, 16877, 16878. Sablayan, Mindoro. December 12, 1908. Length 160 to 227 mm.

14569. Maculabo Island, southern Luzon. June 14, 1909. Length 140 mm.

12282. Masbate Reef, Masbate Island. April 20, 1908. Length 202 mm.

7232. Masinloc, Zambales. November 22, 1908. Length 409 mm.

6263, 6267. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 298 to 338. (110).

8063, 16984. Mompog Island, Anabayas Islands. March 3, 1909. Length 150 to 248 mm.

18587. Murcielagos Bay, Mindanao. August 21, 1909. Length 132 mm.

6611, 12500. Northwest Point, Verde Island, southern Luzon. July 22, 1908. Length 208 to 306 mm.

18631. Saboon Island, Ragay Gulf. March 10, 1909. Length 108 mm.
 4993. Sanguisiapo Island. February 24, 1908. Length 337 mm.
 11894, 18159. San Miguel Harbor, Ticao Island. April 21, 1908. Length 100 to 191 mm. (S. 594). Back seal brown, becoming slightly lighter below. Narrow longitudinal stripes of dark slate on middle of side; central portion brown, interspaces amber and defined from narrow pale line by darker or nearly sepia border. Dorsal slaty, reddish brown at bases of membranes and their center and membranes of soft fin dull yellowish. Caudal and anal with hyaline membranes, rays body color. Pectoral rays dusky, membranes hyaline, black at bases. Ventral darker than anal.
 5691, 5692. Santa Cruz, Marinduque. April 24, 1908. Length 247 to 288 mm.
 5718. Surigao, Mindanao. May 8, 1908. Length 275 mm.
 14215. Taganak Island. January 7, 1909. Length 145 mm.
 4903, 8866. Talajit Island, Buang Bay. March 15, 1909. Length 185 to 202 mm.
 7363. Tara Island. December 15, 1908. Length 385 mm.
 6843. Tataan, Simulac Island. February 19, 1908. Length 220 mm.
 12382. Tataan. February 21, 1908. Length 175 mm. (S. 272).
 22161. Tutu Bay, Jolo Island. September 19, 1909. Length 90 mm. (1957).
 Olive, becoming yellowish on middle of side. Narrow dusky blue stripes bounded by darker, stripe an interval less than diameter of pupil; yellowish body stripes continued somewhat paler below and darker stripes grayish. Lower jaw and maxillary with slight yellowish wash. Dorsal body color, with pale bars on spinous portion and black centered ocellus at bases of second and third rays. Caudal with slight yellowish tinge. Anal similar, paler. Paired fins dusky.
 7662. Ulugan Bay, Palawan. December 28, 1908. Length 407 mm.
 7700. Ulugan Bay near Rita Island. December 29, 1908. Length 345 mm.
 19044. Varadero Bay, Mindoro. July 23, 1908. Length 152 mm.
 7147. West coast Palaui Island. November 18, 1908. Length 340 mm.
 4735. Maricaban Island, Luzon. January 20, 1908. Length 185 mm.
 A1466. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 317 mm.
 14938, 22729, 22730. Talissi Island, north of Celebes. November 9, 1909. Length 69 to 175 mm.
 12800. Tidore Island, south of Ternate. November 25, 1909. Length 120 mm. (S. 2134). Tomahu Island, Bouro. December 12, 1909. Length 77 mm.

Genus *PROMICROPS* Poey

Promicrops POEY, Repert. Fisico Nat. Isla de Cuba, vol. 2, 1868, p. 287.

Type *Serranus guaza* POEY.

Itaiara VAILLANT and BOCOURT, Mission Scient. Mexique, Poiss., vol. 4, 1878, p. 70. Type *Serranus itaiara* LICHTENSTEIN, monotypic.

Phrynotitan GILL, Standard Natural History, vol. 3, 1885, p. 255. Type *Batrachus gigas* GÜNTHER, orthotypic.

Cranium very wide with level interorbital region. Tubes of lateral line each formed as several radiating tubules. Dorsal spines short, low.

The largest of the groupers, very closely related to *Serranus*, likewise *Stereolepis* and *Garrupa*. Apparently but two species known, living in tropical seas, the Atlantic and East Pacific *Promicrops guttatus* Linnaeus and the following.

PROMICROPS LANCEOLATUS (Bloch)

Holocentrus lanceolatus BLOCH, *Naturl. Auslând. Fische*, vol. 4, 1790, p. 92, pl. 242, fig. 1. East Indies.—WALBAUM, *Artedi Pisc.*, vol. 3, 1792, p. 645 (on BLOCH).—FORSTER, *Fauna Indica*, 1795, p. 16.—SCHNEIDER, *Syst. Ichth.* Bloch, 1801, p. 315 (East Indies).—LACÉPÈDE, *Hist. Nat. Poiss.*, vol. 4, 1802, pp. 340, 380 (East Indies).

Serranus lanceolatus CUVIER, *Hist. Nat. Poiss.*, vol. 2, 1829, p. 316 (Pondicherry).—CANTOR, *Cat. Malayan Fishes*, 1850, p. 8 (Pinang Sea).—GÜNTHER, *Cat. Fishes Brit. Mus.*, vol. 1, 1859, p. 107 (copied).—DAY, *Fishes of Malabar*, 1865, p. 4, pl. 1, fig. 1.—PLAYFAIR, *Fishes of Zanzibar*, 1866, p. 4 (Zanzibar).—DAY, *Fishes of India*, pt. 1, 1875, p. 18, pl. 4, fig. 1.—KÁROLI, *Termesz. Füzetek*, Budapest, vol. 5, 1882, p. 149 (Singapore).—MACLEAY, *Proc. Linn. Soc. New South Wales*, ser. 2, vol. 1, 1886, p. 883 (Cairns district).—DAY, *Fauna Brit. India*, vol. 1, 1889, p. 450.—KENT, *Great Barrier Reef*, 1893, p. 369 (Queensland).—FOWLER, *Proc. Acad. Nat. Sci. Philadelphia*, 1907, p. 257 (Padang material); 1925, p. 223 (Natal); *Mem. Bishop Mus.*, vol. 10, 1928, p. 184 (Apiang, Gilbert Islands).

Epinephelus lanceolatus BLEEKER, *Atlas Ichth. Ind. Néerland.*, vol. 7, 1873–76, p. 49 (Singapore, Banka, Java, Celebes, Goram); vol. 8, 1876–77, pl. (54) 332, fig. 3.—BOULENGER, *Cat. Fish. Brit. Mus.*, vol. 1, 1895, p. 251 (Port Natal, Mauritius, Zanzibar, Seychelles, Madras, Pinang, Singapore, West Africa?).—FOWLER, *Journ. Acad. Nat. Sci. Phila.*, ser. 2, vol. 12, 1904, p. 524 (Padang, Sumatra).—GILCHRIST and THOMPSON, *Ann. South Afric. Mus.*, vol. 6, 1908–10, p. 219 (Durban Museum).—BARNARD, *Ann. South Afric. Mus.*, vol. 21, 1927, p. 486 (Natal coast).—JORDAN, EVERMANN, TANAKA, *Proc. Calif. Acad. Sci.*, ser. 4, vol. 16, No. 20, 1927, p. 654 (Honolulu).

Promicrops lanceolata JORDAN and EVERMANN, *Proc. U. S. Nat. Mus.*, vol. 25, 1902, p. 342 (Formosa).

Serranus geographicus CUVIER, *Hist. Nat. Poiss.*, vol. 2, 1828, p. 322. Java.—GÜNTHER, *Cat. Fish. Brit. Mus.*, vol. 1, 1859, p. 150 (copied).

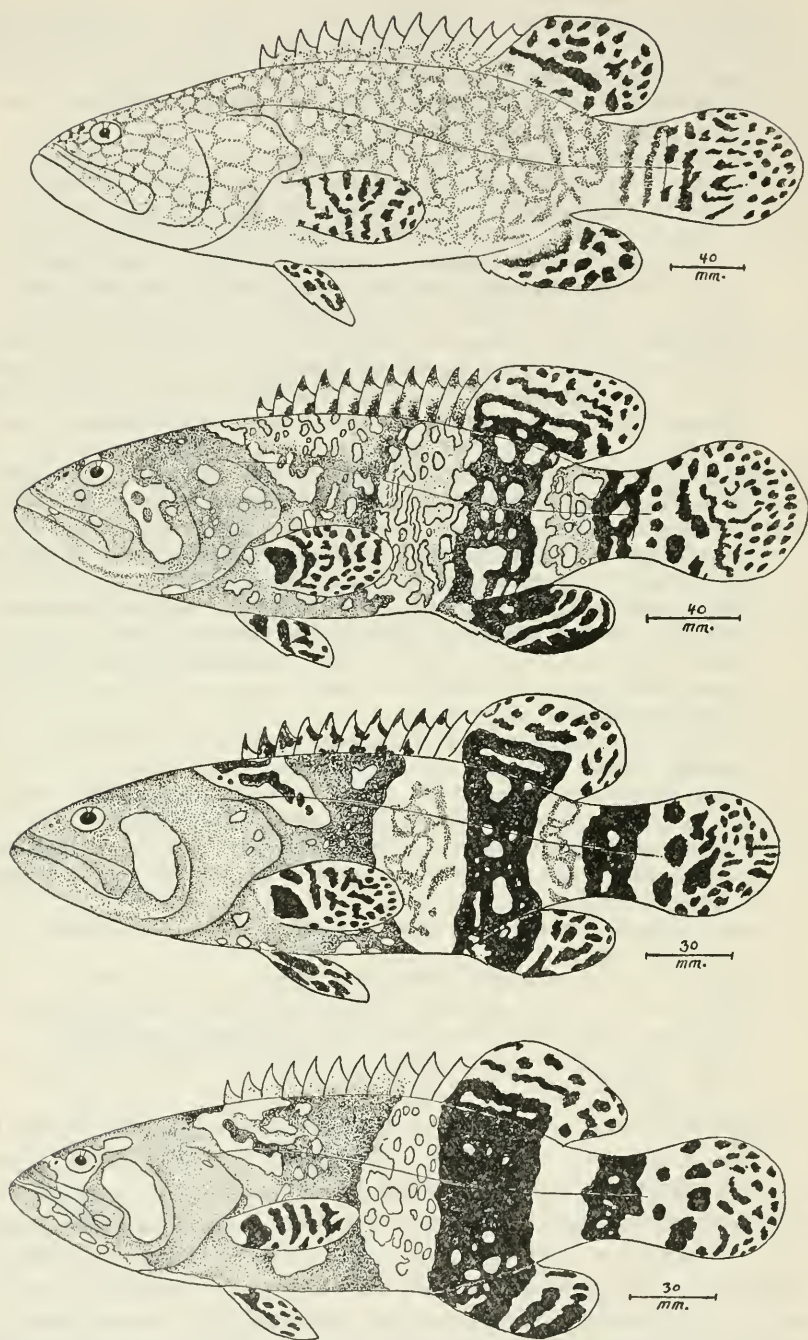
Serranus horridus (not CUVIER) CANTOR, *Cat. Malayan Fishes*, 1850, p. 9 (Pinang Sea, Singapore).—GÜNTHER, *Cat. Fish. Brit. Mus.*, vol. 1, 1859, p. 136 (no locality).

Batrachus gigas GÜNTHER, *Ann. Mag. Nat. Hist.*, ser. 4, vol. 3, 1869, p. 131. Seychelles Islands.

Oligorus terrae-reginae RAMSAY, *Proc. Linn. Soc. New South Wales*, vol. 5, 1881, p. 93. Northern rivers and inlets of Wide Bay district and mouth of Barrum River, about 20 miles from Maryborough, Queensland.

Oligorus goliath DE VIS, *Proc. Linn. Soc. New South Wales*, vol. 7, 1883, p. 318. Queensland.

Depth $3\frac{1}{3}$ to $3\frac{2}{3}$; head $2\frac{1}{5}$ to $2\frac{1}{3}$, width 2 to $2\frac{1}{8}$. Snout $4\frac{1}{2}$ to 5 in head from snout tip; eye $7\frac{1}{4}$ to $8\frac{1}{2}$, $1\frac{3}{5}$ to $1\frac{1}{2}$ in snout, $1\frac{2}{5}$ to $1\frac{7}{8}$ in interorbital; maxillary reaches well beyond eye, expansion 1 to $1\frac{1}{2}$ in eye, length 2 to $2\frac{1}{8}$ in head from snout tip; teeth equal, in broad bands in jaws and 3 rows in mandible laterally; in young mandibular teeth narrow biserially; pair of small canines in front of each jaw, often double; vomer and palatines with broad bands of small teeth; interorbital $4\frac{2}{3}$ to $5\frac{1}{2}$, little elevated; preopercle edge with very obsolete denticulations or nearly smooth; 3 opercular spines,

FIGURE 24.—*PROMICROPS LANCEOLATUS* (BLOCH), VARIATION

upper and lower obsolete and lower most advanced. Gill rakers 10+15 or 16, short, robust, $\frac{2}{3}$ of gill filaments which $\frac{1}{8}$ of body; 9 to 12 rudimentary above and below.

Scales 86 to 98 in lateral line to caudal base and 6 to 8 more on latter; tubes 50 to 60 in lateral line to caudal base and 10 more on latter; 21 or 22 scales above lateral line, 28 to 31 below, 50 predorsal, 30 rows on cheek; body scales without small, basal, auxiliary scales; head with small scales, more or less smooth; basal parts of fins minutely scaled; upper half of maxillary finely scaled. Scales with 5 to 7 basal radiating striae; circuli fine.

D. XI, 14, 1 or 15, 1, third spine $4\frac{1}{2}$ to 5 in total head length, sixth ray $2\frac{2}{5}$ to $2\frac{5}{8}$; A. III, 8, 1, third spine $4\frac{1}{5}$ to 5, fifth ray $2\frac{1}{2}$ to $2\frac{5}{8}$; caudal $1\frac{3}{4}$ to $1\frac{2}{3}$, rounded; least depth of caudal peduncle $3\frac{2}{3}$ to $3\frac{3}{4}$; pectoral $1\frac{4}{5}$ to $1\frac{7}{8}$; ventral $2\frac{1}{3}$ to $2\frac{1}{2}$.

Deep grayish dusky, more or less inclined to blackish on back and whitish below. Sides variegated with obscure dusky mottlings. Diffuse mottlings and blotches of head becoming distinct on sides. Body below soiled with darker grayish or dirty gray markings. Interopercle and lower edge of preopercle with large blackish brown blotch. Vertical fins dilute brownish yellow, marked with black spots or blotches. Paired fins bright lemon yellow, variably spotted and blotched with black.

Zanzibar, Natal, Mauritius, Seychelles, India, East Indies, Formosa, Queensland, Micronesia. Boulenger doubtfully reports an example 1779 mm. long, stuffed, in the British Museum, from West Africa. Until more secure evidence from that region is forthcoming it seems best to us to consider its distribution Indo-Pacific. The species has not previously been reported from the Philippines.

6316. Cavite market. June 27, 1908. Length 410 mm.

9362. Cebu market, Cebu. August 25, 1909. Length 264 mm.

6298. Manilla market. June 12, 1908. Length 237 mm.

1421. Makasser market. December 22, 1909. Length 330 mm.

Genus CROMILEPTES Swainson

Cromileptes SWAINSON, Nat. Hist. Animals, vol. 2, 1839, p. 201. Type *Serranus altivelis* VALENCIENNES, designated by BLEEKER, Arch. Néerland. Sci. Nat. Haarlem, vol. 11, 1876, p. 257.

Serranichthys BLEEKER, Nat. Tijds. Nederland. Indië, vol. 8, 1855, p. 344.

Type *Serranus altivelis* VALENCIENNES, monotypic.

Body strongly compressed. Mouth large, protractile. Maxillary exposed, with supplemental bone. Teeth in jaws in broad bands, villiform, inner depressible and hinged basally; teeth on vomer and few on palatines. Tongue smooth. Hind nostril large crescentic slit, placed vertically. Preopercle serrated. Opercle with 2 spines. Gill membranes separate. Pseudobranchiae present. Gill rakers very short, nearly rudimentary. Branchiostegals 7. Vertebrae 24.

of which 14 caudal. Scales very small, cycloid. Head entirely scaly. Lateral line complete, extends on caudal; tubes straight or directed upwards. Dorsal with 10 spines, rays 18, spinous part nearly long as soft. Anal spines 3, rays 10, fins short. Caudal rounded. Pectoral rays 17 or 18, symmetrical, rounded. Ventral with strong spine, below pectoral, fins close together.

Indian and western tropical Pacific Oceans.

CROMILEPTES ALTIVELIS (Valenciennes)

Serranus altivelis VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 324, pl. 35. Java.—RICHARDSON, Ichth. China, Japan, 1846, p. 230 (copied).—CANTOR, Cat. Malayan Fish., 1850, p. 10 (Pinang Sea).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 152 (East Indies, China, Port Essington).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1882, p. 150 (Singapore).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 8 (Macassar, South Celebes; Cebu).—GORGOZA, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 17, 1888, p. 282 (Manila Bay; Nasugbu, Batangas).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 463 (Luzon, Manila Bay, Cavite, Santa Cruz, Nasugbu, Batangas).—(REGAN) BEDOT, Rev. Suisse Zool., vol. 17, 1909, p. 169 (Amboina).

Cromileptes altivelis SWAINSON, Nat. Hist. Animals, vol. 2, 1839, p. 201 (name only).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 30 (Singapore, Pinang, Bintang, Java, Duizend Islands, Celebes, Batjan, Amboina).—DAY, Fishes of India, pt. 1, 1875, p. 9, pl. 1, fig. 2 (Nicobars).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 8, 1876-77, pl. (44) 322, fig. 3.—DAY, Fauna Brit. Ind., vol. 1, 1889, p. 441, fig. 139.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895 p. 271 (Cebu, China, Pinang, Macassar, East Indies, Port Essington).—JORDAN and SEALE, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 781 (Negros); Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 19 (Manila).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 78 (Bacon).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 206 (Gisser Island and Elat, High Key).—OGILBY, Mem. Queensland Mus., vol. 2, 1913, p. 90 (Darnley Island and Cairns Reef); vol. 6, 1918, p. 100 (Moreton Bay).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 29 (Cebu).

Depth $2\frac{2}{3}$ to $2\frac{4}{5}$; head $2\frac{1}{3}$ to $2\frac{3}{5}$, width $2\frac{1}{10}$ to $2\frac{4}{5}$. Snout 4 to $5\frac{1}{3}$ in head from snout tip; eye $4\frac{3}{4}$ to $7\frac{1}{5}$, $1\frac{1}{5}$ to $1\frac{1}{3}$ in snout, greater than interorbital; maxillary reaches opposite middle of eye, expansion $1\frac{1}{5}$ to $1\frac{2}{3}$ in eye, length $2\frac{2}{5}$ to $2\frac{7}{8}$ in head from snout tip; teeth villiform, in rather wide bands, in young inner row in each jaw slightly longer, present on vomer and palatines but none on tongue; interorbital 7 to $7\frac{7}{8}$ in head from snout tip, nearly level; hind preopercle edge denticulate, with 2 points at angle little enlarged, become small with age; opercular spines 3, median nearer lower and most posterior. Gill rakers 6 + 14, low knobs half of gill filaments, which $1\frac{1}{2}$ in eye.

Scales 74 to 100 in lateral line to caudal base and 12 to 20 more on latter; tubes 44 to 70 in lateral line to caudal base and 5 to 7 more on latter; 21 to 24 scales above, 34 to 37 below, 80 to 90 predorsal;

30 to 33 rows across cheek to preopercle angle; muzzle, including maxillary and preorbital, naked; fins all more or less covered with fine scales. Scales with 4 to 8 basal radiating striae; circuli fine.

D. X, 17, 1 or 18, 1, tenth spine $2\frac{1}{8}$ to $2\frac{1}{2}$ in total head length, third ray $1\frac{1}{2}$ to $2\frac{1}{8}$; A. III, 10, 1, third spine $2\frac{1}{3}$ to $3\frac{1}{3}$, sixth ray $1\frac{1}{2}$ to $2\frac{1}{8}$; caudal $1\frac{1}{3}$ to $1\frac{2}{3}$, convex behind; least depth of caudal peduncle 3 to $3\frac{2}{3}$; pectoral $1\frac{1}{4}$ to $1\frac{1}{2}$; ventral $1\frac{2}{3}$ to 2.

Dull reddish brown or terracotta color. Head, body and fins marked with round blackish spots, always greatly less in diameter than interspaces; in young spots very large or not more than 4 or 5 along lateral line, with age 18 or 20, also in young spots ocellated with whitish border.

India, Nicobars, East Indies, Philippines, China, Queensland. Some of our examples reach a greater size than given by Bleeker (530 mm.). They show the changes in coloration due to age, the black spots few in the young and becoming quite numerous with age.

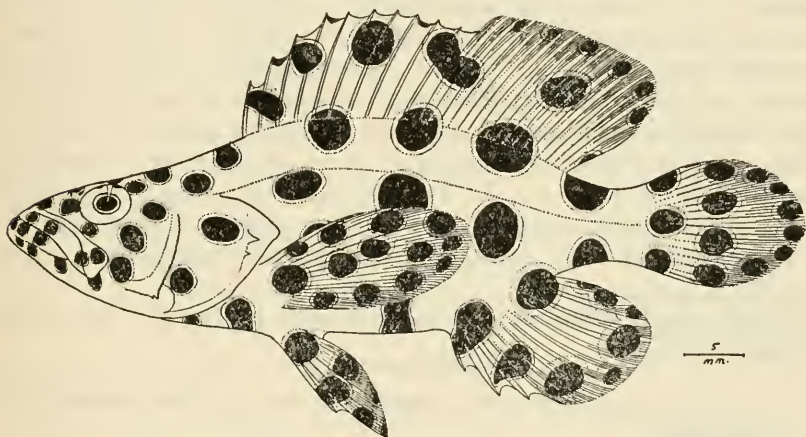


FIGURE 25.—*CROMILEPTES ALTIVELIS* (VALENCIENNES), YOUNG

17180. Butauanan Island, eastern Luzon. June 13, 1909. Length 180 mm.
 13180. Cataingan Bay, east of Masbate. April 17, 1908. Length 105 mm.
 5356. Cebu market. April 5, 1908. Length 241 mm.
 21750. Cebu market. March 28, 1909. Length 79 mm.
 7588. Endeavor Strait, Palawan Island. December 23, 1908. Length 357 mm.
 4832. Jolo market. February 11, 1908. Length 275 mm.
 7762. Manila market. June 17, 1908. Length 174 mm.
 6718. Manila market. December 4, 1908. Length 315 mm.
 22448. Manila market. April 17, 1909. Length 650 mm.
 7980. Pagapas Bay. February 20, 1909. Length 312 mm.
 A762. Mabul Island, vicinity of Subuka Bay, Borneo. September 29, 1909.
 Length 385 mm.
 A990. Togian Bay, Togian Island, Gulf of Tomini, Celebes. November 19, 1909.
 Length 478 mm.

Genus *ANTHIAS* Bloch

Anthias BLOCH, *Naturg. Ausländ. Fische*, vol. 6, pt. 9, 1792, p. 97. Type *Labrus anthias* LINNAEUS, tautotypic.

Aylopon RAFINESQUE, Carrat. Nuov. Anim. Sicil., 1810, p. 52. Type *Labrus anthias* LINNAEUS. *Aylopon* RAFINESQUE proposed to replace *Anthias* BLOCH, supposed to be preoccupied.

Pronotogrammus GILL, Proc. Acad. Nat. Sci. Philadelphia, 1863, p. 80. Type *Pronotogrammus multifasciatus* GILL, monotypic.

Pseudanthias BLEEKER, Nat. Tijds. Dierk., vol. 4, 1874, p. 156. Type *Anthias pleurotaenia* BLEEKER, orthotypic.

Sacura JORDAN and RICHARDSON, Proc. U. S. Nat. Mus., vol. 37, 1910, p. 468. Type *Anthias margaritaceus* HILGENDORF, monotypic.

Franzia JORDAN and THOMPSON, Mem. Carnegie Mus., vol. 6, No. 4, 1914, p. 251. Type *Anthias nobilis* FRANZ, orthotypic.

Body greatly compressed. Mouth large, protractile. Maxillary exposed, without supplemental bone. Jaws with villiform teeth, intermixed with curved canines; small group of teeth on vomer and narrow row on each palatine; tongue smooth or with few teeth. Preopercle serrated, without antrose teeth on lower edge. Opercle with 2 or 3 spines. Gill membranes separate. Pseudobranchiae present. Gill rakers very long, slender, close set. Branchiostegals 7. Vertebrae 25 or 26, of which 15 or 16 caudal. Scales moderate or rather large, ciliated or smooth. Head partly or entirely scaled. Dorsals and anals more or less scaly. Lateral line single, complete, tube straight or with ascending tubule extending along nearly entire scale. Dorsal with 10 spines, rays 14 to 18, spinous fin variably longer or shorter than soft fin, fins undivided by notch. Anal short, with 3 spines and 6 to 8 rays. Caudal emarginate. Pectoral rays 17 or 18, fin pointed, subsymmetrical. Ventral with strong spine, below pectoral, fins close together.

Usually small fishes, dainty and brilliant, living in tropical and subtropical seas.

ANALYSIS OF THE SPECIES

*a*¹. Third dorsal spine prolonged in filament, at least in adult; caudal deeply emarginate.

*b*¹. One or 2 white lines from lower eye edge continued back and below pectoral base and parallel along lower side of tail-----**pleurotaenia**

*b*². Broad white band from lower eye edge out on pectoral base...**squamipinnis**

*a*². Third dorsal spine not prolonged in filament with age; narrow pale line from eye to pectoral base; caudal little emarginate.

*c*¹. Caudal truncate, ends little pointed; depth less than 3, no whitish lateral band -----**cichlops**

*c*². Caudal very concave; depth more than 3; diffuse whitish lateral band.
albofasciatus

ANTHIAS PLEUROTAENIA Bleeker

Anthias pleurotaenia BLEEKER, Act. Soc. Sci. Ind. Néerland. (Visch. Amboina), vol. 2, 1857, p. 34. Amboina.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 502 (copied).—OGILBY, Proc. Zool. Soc. London, 1889, p. 153 (Great Barrier Reef).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 331 (compiled).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 186 (compiled).

Pseudanthias pleurotaenia BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 17, pl. (9) 287, fig. 1 (Amboina).

Anthias (Pseudanthias) taeniatus KLUNZINGER, Fische Roth. Meer., 1884, p. 9, pl. 3, fig. 2. Red Sea.

Depth $2\frac{1}{2}$ to $2\frac{3}{5}$; head $3\frac{1}{8}$ to $3\frac{1}{4}$, width $1\frac{1}{5}$ to 2. Snout $4\frac{1}{2}$ to $4\frac{4}{5}$ in head from snout tip; eye $3\frac{2}{5}$ to 4, much greater than snout; $1\frac{1}{8}$ to $1\frac{1}{5}$ in interorbital; maxillary $\frac{3}{5}$ to $\frac{3}{4}$ in eye, expansion $1\frac{1}{5}$ to $1\frac{1}{3}$ in eye, length $2\frac{1}{5}$ to $2\frac{1}{4}$ in head from snout tip; teeth in narrow villiform bands in jaws, outer row little enlarged; pair of wide set upper front canines, also lower pair, smaller and flaring outward, besides antero-lateral recurved larger canine on each mandibular ramus; small band of villiform teeth on each palatine and patch on vomer; interorbital $3\frac{1}{8}$ to $3\frac{1}{4}$, well convex; hind preopercle edge denticulate; opercular spines 3, lower closer to median and most forward. Gill rakers $11 + 26$, finely lanceolate, little longer than gill filaments or $1\frac{1}{8}$ in eye.

Scales 41 to 45 in lateral line to caudal base and 1 more tubular on latter; 6 scales above, 17 or 18 below, 28 to 30 predorsal forward not quite to snout tip; 9 or 10 rows across cheek to preopercle angle, with last 3 rows on preopercle flange; body scales with few or no auxiliary small basal scales; 5 or 6 transverse rows of scales on maxillary expansion. Scales with 9 to 14 basal radiating striae; 66 to 105 apical denticles; circuli very fine.

D. X, 17, 1, third spine $1\frac{1}{2}$ to $2\frac{2}{3}$ in total head length, fourteenth ray $1\frac{1}{5}$ to $2\frac{2}{5}$; A. III, 7, 1, third spine 2 to $2\frac{1}{8}$, third ray $1\frac{1}{10}$ in young to 3 in combined head and body to caudal base in adult; caudal $2\frac{1}{5}$ to $2\frac{2}{3}$, deeply concave, with produced filamentous points; ventral 2 to 3; least depth of caudal peduncle 2 to $2\frac{1}{8}$ in total head length; pectoral 1.

Light brown generally, little paler below. Fins all uniformly pale. Two parallel gray white lines from lower eye edge obliquely back to form loop before and over pectoral base; in smaller example upper line broken as spots or dots anteriorly or on postorbital. On trunk and tail below gray white lines also continue parallel at same width from the pectoral axil and fade out on tail posteriorly. Iris pale. Upper dorsal edge narrowly, also lower anal edge and front ventral edge narrowly gray white.

Originally this species was known to Bleeker from only a single example 134 mm. long. Our specimens, though showing much fewer than 52 scales in the lateral line as Bleeker gives, also show a second parallel light line from the eye to the pectoral origin which is not indicated on his figure. Our larger specimen also has a prolonged ventral filament, which Bleeker does not show, besides he does not indicate the numerous fine scales forming a sheath along spinous dorsal base and those extending out over the soft dorsal and a great part of the paired fins. Our specimens have serrated suprascapulas.

Klunzinger gives the color of his *Anthias* (*Pseudanthias*) *taeniatus* as dark shining red. A narrow white streak from the maxillary to below the eye and the pectoral base. On body each side 3 broad white longitudinal bands, one along dorsal base, second begins before nape and extends from the gill opening along middle of side to the tail. A third light band extends along side of belly, from the head to the anal. Fins red, ventral edge blackish. Caudal with red cross band.

6904, 6905 (1999, 2000). Danawan and Si Amil Islands, Borneo. September 26, 1909. Length 89 to 125 mm.

ANTHIAS SQUAMIPINNIS (Peters)

- Serranus* (*Anthias*) *squamipinnis* PETERS, Monatsb. Akad. Wiss. Berlin, 1855, p. 429. Mozambique.
- Anthias squamipinnis* GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 89 (copied).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 706 (Koseir, Red Sea).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 329 (copied).—BORSIERI, Ann. Mus. Civ. Stor. Nat. Genova, vol. 41, 1904, p. 193 (Gulf of Zula, Red Sea).—REGAN, Ann. Durban Mus., vol. 1, pt. 5, 1917, p. 458 (Durban).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 462 (Natal coast).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 185 (New Guinea).
- Anthias* (*Pseudanthias*) *squamipinnis* KLUNZINGER, Fische Roth. Meer., 1884, p. 9, pl. 3, figs. 1-a.—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 133, pl. 17, figs. 1, a-b.
- Anthias cheirospilus* BLEEKER, Act. Soc. Sci. Ind. Néerland. (Visch. Amboina), vol. 2, 1857, p. 36. Amboina.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 502 (copied).
- Pseudanthias chirosphilus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 18, pl. (10) 288, fig. 1 (Amboina).
- Anthias lepidolepis* BLEEKER, Act. Soc. Sci. Ind. Néerland. (Visch. Amboina), vol. 2, 1857, p. 37. Amboina.
- Pseudanthias lepidolepis* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 19, pl. (10) 288, fig. 4 (Amboina).
- ?*Anthias* (*Pseudanthias*) *gibbosus* KLUNZINGER, Fische Roth. Meer., 1884, p. 9. Red Sea.
- Anthias nobilis* FRANZ, Abh. Bayer. Akad. Wiss., vol. 4, pt. 1, 1910, p. 38, pl. 4, fig. 44. Misaki.
- Franzia nobilis* JORDAN and THOMPSON, Mem. Carnegie Mus., vol. 6, No. 4, 1914, p. 251, pl. 29, fig. 2 (Misaki).—TANAKA, Fig. Descript. Fishes of Japan, vol. 31, 1921, p. 567, pl. 143, fig. 397 (Tokyo market).
- Franzia ardens* JORDAN and THOMPSON, Mem. Carnegie Mus., vol. 6, No. 4, 1914, p. 251, pl. 30, fig. 1. Misaki.
- Franzia affinis* TANAKA, Dobutsugaku Zasshi (Zool. Magazine), vol. 27, No. 325, Nov. 15, 1915, p. 566. Nagasaki; Fig. Descript. Fishes of Japan, vol. 31, 1921, p. 572, pl. 144, fig. 400 (Nagasaki).
- Franzia pectoralis* TANAKA, Dobutsugaku Zasshi (Zool. Magazine), vol. 29, No. 347, Sept. 15, 1917, p. 268. Tanabe.
- Franzia rubra* TANAKA, Dobutsugaku Zasshi (Zool. Mag.), vol. 29, No. 347, Sept. 15, 1917, p. 268. Tanabe; Fig. Descript. Fishes of Japan, vol. 31, 1921, p. 571, pl. 143, fig. 398 (Tanabe).

Depth $2\frac{1}{2}$ to $2\frac{3}{5}$; head $3\frac{1}{4}$ to $3\frac{2}{5}$, width $1\frac{7}{8}$ to 2. Snout 5 to $5\frac{1}{4}$ in head from upper jaw tip; eye 3 to 4, greater than snout to equal with age, greater than interorbital to $1\frac{1}{4}$ with age; maxillary reaches opposite hind eye edge, expansion $1\frac{1}{5}$ to $1\frac{3}{5}$ in eye, length $2\frac{1}{10}$ to $2\frac{1}{4}$ in head from snout tip; front of each jaw with outer, forward directed, short, conic canine; lower jaw with 1 or 2 lateral canines medially, hooked backwardly, each side; interorbital $3\frac{1}{5}$ to $3\frac{1}{3}$, convexly elevated; preorbital width less than half of pupil and infraorbital rim very narrow; preopercle edge denticulate; opercular spines 2. Gill rakers 9+25, lanceolate, greatly longer than gill filaments or $1\frac{1}{5}$ in eye.

Tubular scales 40 to 43 in lateral line to caudal base and 2 or 3 more on latter; 5 scales above, 14 below, 26 predorsal forward to front lip edge, 6 rows across cheek to preopercle ridge and 3 more over preopercle flange to edge; 5 rows of scales transversely across maxillary expansion; all body scales with 1 or 2 small basal auxiliary scales,

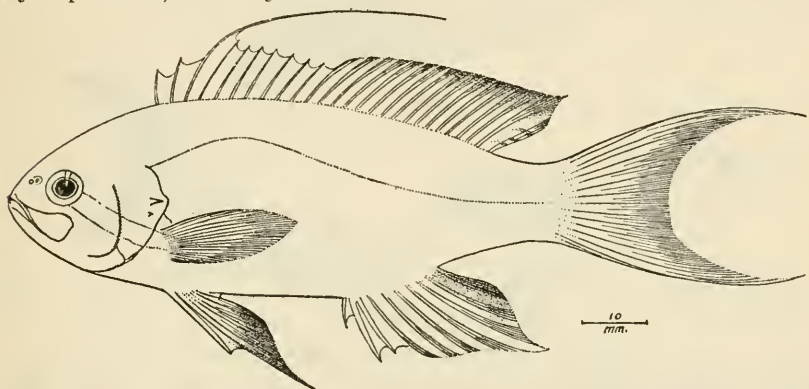


FIGURE 26.—*ANTHIAS SQUAMIPINNIS* (PETERS), ADULT

sometimes 3; fins all more or less covered, at least basally, with small scales. Scales with 12 to 16 basal radiating striae; apical denticles 78 to 87 in single series; circuli fine; auxiliary basal scales with 2 basal radiating striae, edge deeply scalloped and apical denticles 20 to 25.

D. X, 17, 1 or 18, 1, third spine longest and sometimes ends in filament, $2\frac{1}{2}$ in total length of head and body to caudal base, third spine $2\frac{1}{3}$ in total head length in young; first ray $1\frac{1}{3}$ in last ray which $1\frac{1}{2}$ in total head length, first ray subequal with last in young or $2\frac{1}{8}$ in total head length; A. III, 7, 1, second spine $2\frac{1}{5}$, third to fifth ray often filamentous and fourth equals total head length; caudal ends in filamentous points, $1\frac{3}{4}$ in rest of fish; least depth of caudal peduncle 2 to $2\frac{1}{5}$ in total head length; pectoral 1; ventral $2\frac{1}{5}$ to $3\frac{3}{4}$ in combined head and body to caudal base.

In alcohol brown, paler to whitish below. Broad pale gray band, little less than eye in width extends from eye to pectoral basally.

Iris grayish. Fins all pale brown, some examples with soft dorsal becoming dark dusky brown at terminal hind point. Ventral pale, with broad outer or anterior darker band.

Red Sea, Mozambique, Amboina, Philippines. Alcoholic specimens usually with the pale oblique band from the lower eye edge down and out on the pectoral base.

Possibly *Anthias* (*Pseudanthias*) *gibbosus* may be a young stage, as suggested by Boulenger, for it is described from an example but 74 mm. long. Klunzinger gives the color as reddish, with nearly horizontal or little inclined clear streak from the hind lower eye edge to the middle of the pectoral base. He also mentions that one example has a clear yellowish band from the opercular spine sloping behind to the caudal fin. The Japanese nominal forms described by Franz, Jordan, Thompson, and Tanaka, all seem to us to be variants of the present species.

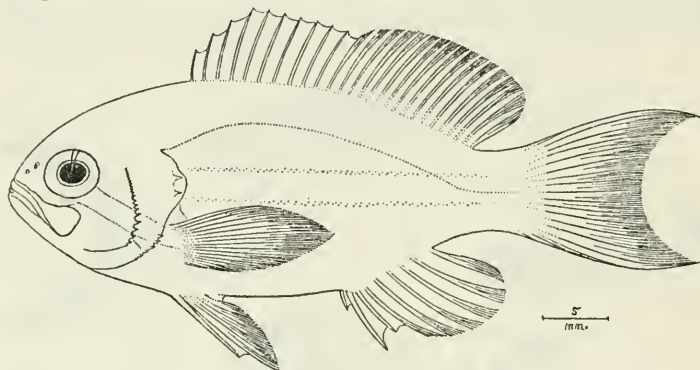


FIGURE 27.—*ANTHIAS SQUAMIPINNIS* (PETERS), YOUNG

290, 289, 15309. Busin Harbor, Burias Island. March 8, 1909. Length 104 to 112 mm.

6066. Cagayan Island, Cagayanes Islands, Jolo Sea. March 31, 1909. Length 92 to 102 mm. 10 examples.

15043. Calangaman Island, between Leyte and Cebu. March 16, 1909. Length 94 mm.

22152, 22153. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 71 to 73 mm.

One example. Caracaran, Batan Island, east coast Luzon. June 8, 1909. Length 89 mm.

Twenty-one examples. Galera Bay, Mindoro. June 9, 1908. Length 68 to 97 mm.

9918, 22935, 22936. Inamucan Bay, Mindanao. August 9, 1909. Length 78 to 103 mm.

Seven examples. Ligo Point, Balayan Island, Luzon. January 18, 1908. Length 62 to 90 mm. Four smaller quite dark or swarthy. Also each caudal lobe with broad pale band longitudinally

20028. Malapascua Island, between Leyte and Cebu. March 16, 1909. Length 78 mm.

One example. Mantacao Island, west coast Bohol. April 8, 1908. Length 64 mm.

- Two examples. Maribojoc Bay, Maribojoc, Bohol Island. March 26, 1909. Length 58 to 65 mm.
- 12284 (593). Masbate Reef, Masbate. April 20, 1908. Length 99 mm.
- Fourteen examples. Northwest Verde Island. July 22, 1908. Length 58 to 73 mm.
- 22801, 22802. Opol, Mindanao. August 4, 1909. Length 74 to 81 mm.
- 22193 to 22195. Pangasinan Island. February 13, 1908. Length 68 to 95 mm.
- 21436, 22025 to 22027. Panpan Point, Tara Island, between Jolo and Tawi Tawi. September 20, 1909. Length 86 to 122 mm. 5 examples.
- Four examples. Port Banalacan, Marinduque Island. February 23, 1909. Length 53 to 97 mm.
- 6941 to 6943, 6944, 7410 to 7413, 22697, 22698. Port Galera, Mindoro. June 9, 1908. Length 72 to 102 mm.
- Seventy-three examples. Port Galera. October 27, 1909. Length 45 to 108 mm.
10307. Port Maricaban. July 21, 1908. Length 35 to 72 mm. 4 examples.
- 8351, 18179 to 18183. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 80 to 128 mm.
- 14973 to 14975 (1257 to 1259), 17491 to 17496, 17510. Refugio Island, Pasacao, Luzon. March 9, 1909. Length 86 to 108 mm.
22501. Sablayan, Mindoro. December 12, 1908. Length 79 to 100 mm. 3 examples.
17983. Simalue Sibi Sibi Island, north of Tawi Tawi. September 23, 1909. Length 80 mm.
- 21883, 21884. Singaan Island, between Jolo and Tawi Tawi. September 21, 1909. Length 87 to 106 mm.
11498. Sulade Island, vicinity Jolo. September 17, 1909. Length 89 mm.
16033. Sulade Island. September 18, 1909. Length 94 mm.
22260. Tapiantana Island. September 13, 1909. Length 104 mm.
23743. Tataan Island, Tawi Tawi. November 11, 1908. Length 93 mm. (276).
- 14302, 14303, 16247, 16249, 16250, 16253, 16255, 16257, 16493. Teomabal Island, vicinity Jolo. September 18, 1909. Length 75 to 108 mm.
10468. Tilig Bay, Subanga Island, southern Luzon. July 14, 1908. Length 63 mm.
10443. Varadero Bay, Mindoro. July 23, 1908. Length 63 mm.
16031. Amboina docks, Amboina, Dutch East Indies. December 7, 1909. Length 117 to 102 mm. Largest with hind caudal edge medianly dusky, very narrow edge outside white. 3 examples.
- Ten examples. Amboina port. December 7, 1909. Length 63 to 100 mm.
- Six examples. Danawan and Si Amil Islands, Borneo. September 12, 1909. Length 54 to 85 mm.
21833. Danawan Island and Si Amil Island. September 26, 1909. Length 95 mm.
16440. Danawan and Si Amil Islands. September 27, 1909. Length 65 to 93 mm. 10 examples.
- 8900 to 8910, 8914. Mabul Island, Sibuko Bay, Borneo. September 29, 1909. Length 44 to 83 mm. 22 examples.
- Six examples. Sipadan Island, Sibuko Bay, Borneo. September 28, 1909. Length 53 to 66 mm.
- Four examples. Sitanki Reef, vicinity Darvel Bay, Borneo. September 24, 1909. Length 83 to 105 mm. (1994).
12920. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 44 mm.

16224. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 104 mm.
12781, 12782. Limbe Strait, Celebes. November 10, 1909. Length 78 to 100 mm. 3 examples.

Two examples. Kayoa Island. November 29, 1909. Length 66 to 83 mm.

21478. Dowarra Island. December 2, 1909. Length 68 mm.

13669. Makyan Island. November 29, 1909. Length 60 to 97 mm. 2 examples.

13830. Powati Harbor, Makyan Island. November 28, 1909. Length 53 to 93 mm. 7 examples.

Five examples. Powati Harbor. November 29, 1909. Length 62 to 84 mm.

Three examples. Maitara Island. November 26, 1909. Length 53 to 89 mm.

One example. Labuan Blanda Island. December 14, 1909. Length 85 mm.

22308. Tidore Island, south of Ternate. November 29, 1909. Length 67 mm.

9947. Doc Can Island, Sulu Sea. January 7, 1910. Length 96 mm.

ANTHIAS CICHLOPS (Bleeker)

Serranus cichlops BLEEKER, Nat. Tijds. Ned. Indië, vol. 4, 1853, p. 245. Priaman, Sumatra.

Anthias cichlops GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 503 (note).—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 328 (compiled).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 458 (Samar, Borongan).

Pseudanthias cichlops BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873-76, p. 20, pl. (11) 289, fig. 1 (Priaman).

Depth $2\frac{3}{5}$ to $3\frac{1}{10}$; head $2\frac{4}{5}$ to $3\frac{1}{8}$, width 2 to $2\frac{1}{8}$. Snout $4\frac{2}{5}$ to 5 in head from snout tip; eye $2\frac{4}{5}$ to $3\frac{2}{3}$, greater than snout, greater than interorbital in young to $1\frac{1}{4}$ with age; maxillary $\frac{3}{5}$ to $\frac{3}{4}$ in eye, expansion $1\frac{1}{4}$ to $2\frac{1}{4}$ in eye, length 2 to $2\frac{1}{5}$ in head; teeth fine, in narrow bands in jaws, anteriorly 2 wide set canines in each jaw, lower recurved; lower jaw also with 2 medio-lateral recurved canines each side; narrow band of fine teeth on each palatine and small patch on vomer; interorbital 3 to $3\frac{4}{5}$ in head, convexly elevated; preopercle edge denticulate, with 2 or 3 spines little enlarged at angle; opercular spines 3, lower most advanced. Gill rakers 11 + 25, finely lanceolate, much longer than gill filaments or $1\frac{1}{8}$ in eye.

Scales 40 or 41 in lateral line to caudal base and 1 or 2 more on latter; 5 above, 12 to 14 below, 23 to 25 predorsal; 10 rows obliquely across cheek to angle of preopercle, of which 3 on preopercle flange; scales on head and body with few auxiliary basal small scales; fins all more or less finely scaled, especially basally; 5 rows of scales transversely across maxillary expansion. Scales with 13 to 15 basal radiating striae; 40 to 60 apical denticles; circuli fine.

D. X, 16, 1 or 15, 1, fourth spine $2\frac{1}{4}$ in total head length, twelfth ray $1\frac{1}{4}$ to $1\frac{1}{2}$; A. III, 7, 1, second spine 2 to $2\frac{1}{2}$, third ray $1\frac{1}{10}$ to $1\frac{2}{5}$; caudal 1 to $1\frac{1}{8}$, broadly crescentic, truncate as expanded to slightly convex behind with age, or tips moderately produced; least depth of caudal peduncle $2\frac{1}{4}$ to $2\frac{2}{3}$; pectoral $1\frac{1}{10}$ to $1\frac{1}{8}$; ventral 1 to $1\frac{1}{8}$.

In alcohol brown or drab brown, whitish below. Narrow gray white line from lower eye edge to gill opening then down to lower pectoral base. Iris gray or light brown. Fins all pale brownish, with oblique brown lines on soft dorsal and anal, and transverse on caudal.

East Indies and Phillipines. This species differs from *Anthias squamipinnis* in its coloration and broader or less forked caudal fin, fewer filaments to the fins and in the presence of a light line, not a broad band, obliquely down and back from the lower eye edge to the pectoral base. It is somewhat like *Anthias cooperi* Regan, but that species is figured with scaleless fins and described with 47 to 49 scales in its lateral line.¹⁵ While it is true our examples do not agree with Bleeker's figure in that he shows the light line from the eye across the cheek to the breast, and not on the pectoral base, in its structural characters it does not seem to differ. But then Bleeker's account is not in agreement with his figure, and though he mentions but one example as 117 mm. long he gives the soft dorsal rays as 16 or 17 and his figure shows 18. *Anthias elongatus* Franz is very similar, if not synonymous, differing chiefly in its uniform red color. As *Pseudanthias elongatus* Tanaka describes it with 8+20 gill rakers on an example 140 mm., which length is greatly in excess of any of our materials.¹⁶

2069 to 2072 (D. 5136). Jolo. February 14, 1908. Length 103 to 105 mm. 18563, 18564 (1913). Malanipa Island, east of Zamboanga. September 8, 1909.

Length 107 to 108 mm.

21978. Murcielagos Bay, Mindanao. August 9, 1909. Length 53 mm.

Sixteen examples. Port Maricaban. July 21, 1908. Length 30 to 73 mm.

11499. Sulade Island, vicinity Jolo. September 17, 1909. Length 99 mm.

16032. Sulade Island. September 18, 1909. Length 88 mm.

(1738, 1739) (D. 5478). Taebuc Point, Leyte. July 29, 1909. Length 81 to 120 mm. 7 examples.

16245, 16246, 16248, 16251, 16252, 16254. Teomabal Island, vicinity Jolo. Length 85 to 109 mm.

6431. West coast Palau Island. November 18, 1908. Length 79 mm.

6904, 6905. Danawan and Si Amil Islands, vicinity Darvel Bay, Borneo. September 26, 1909. Length 89 to 125 mm. (1999, 2000.)

12780. Limbe Strait, Celebes. November 10, 1909. Length 59 to 84 mm. 8 examples.

Four examples. Limbe Strait. November 11, 1909. Length 62 to 75 mm.

12181, 12182, 13828, 13829. Powati Harbor, Makyan Island. November 28, 1909. Length 85 to 101 mm. (2080). 6 examples.

ANTHIAS ALBOFASCIATUS, new species¹⁷

Depth $3\frac{1}{3}$; head $3\frac{1}{4}$, width $1\frac{7}{8}$. Snout $4\frac{4}{5}$ in head from snout tip; eye 3, little greater than snout or interorbital; maxillary reaches

¹⁵ Fauna Geogr. Maldive Laccadive Archipelago, vol. 1, pt. 3, 1902, p. 273. Huddumati; Trans. Linn. Soc. London, ser. 2, vol. 12, Zool., 1908, p. 222, pl. 24, fig. 4 (type; Cargados Carajos; Kurrachee).

¹⁶ Fig. Discript. Fishes of Japan, vol. 31, June 27, 1921, p. 580, pl. 141, fig. 401; vol. 32, July 1, 1922, p. 583 (Tokyo).

¹⁷ *albus*, white; *fascia*, band.

opposite middle of eye, expansion $1\frac{2}{3}$ in eye, length $2\frac{1}{8}$ in head from snout tip; teeth fine, pointed, in narrow bands in jaws, on vomer and palatines; pair of wide set upper canines, lower jaw with close set divergent mandibular pair and larger lateral curved anterior canine; interorbital $3\frac{3}{4}$, convex; preopercle edge serrate; opercle with 3 distinct spines. Gill rakers $11 + 23$, finely lanceolate, twice gill filaments or $1\frac{2}{3}$ in eye.

Scales 35 in lateral line to caudal base and 1 more on latter; 5 above, 13 below, 24 predorsal, 7 across cheek to preopercle edge; maxillary with 4 rows of scales transversely; soft dorsal and anal with small basal scales; caudal largely covered with fine scales. Scales with 11 basal radiating striae; apical denticles 73, slender, biserial; circuli fine.

D. X, 14, 1, third spine 2 in head, twelfth ray $1\frac{1}{4}$; A. III, 7, 1, third spine $2\frac{7}{8}$, fourth ray $1\frac{1}{8}$; caudal (broken) about equals head, deeply emarginate; least depth of caudal peduncle 2; pectoral $1\frac{1}{4}$; ventral $2\frac{1}{2}$ in combined head and body to caudal base.

Uniformly light brown, lower sides and under surface silvery white. Diffuse, obscure median pale lateral band from eye to caudal base. Iris silvery white. Fins all pale brown. Caudal with median rays grayish terminally.

Only known from the type, U.S.N.M. No. 89988.

Diagnosis.—Its pale coloration with a diffuse silvery median lateral band is diagnostic.

4356 (D. 5308). $21^{\circ} 54' N.$, $115^{\circ} 42' E.$ November 4, 1908. 62 fathoms. Length 100 mm. (Type.)

Genus GRAMMISTES Schneider

Grammistes SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 182. Type *Grammistes orientalis* Schneider, designated by BLEEKER, Arch. Néerland., Sci. Nat. Haarlem, vol. 11, 1876, p. 258.

Body compressed. Mouth large, protractile. Chin with rudimentary dermal appendage. Maxillary exposed, with supplemental bone. Bands of villiform teeth in jaws and on vomer and palatines; tongue smooth. Preopercle with 2 or 3 spines on hind edge. Opercle with 3 strong spines. Gill membranes separate. Pseudobranchiae present. Gill rakers short. Branchiostegals 7. Vertebrae 24, of which 13 caudal. Scales very small, cycloid, and obtusely keeled scales enveloped in slimy coating of epidermis. Head partly naked, scaly on sides. Lateral line complete, tubes straight. Dorsal spines 6 or 7, rays 13 to 15, spinous fin long as or little shorter than soft fin. Anal without distinct spine, rays 10 or 11. Caudal rounded. Pectoral rays 17, partly symmetrical, rounded. Ventral with short spine, fins close together in advance of pectoral.

Indian and western tropical Pacific Oceans.

GRAMMISTES SEXLINEATUS (Thunberg)

- Perca sexlineata* THUNBERG, Kon. Vet. Akad. Handl. Stockholm, vol. 13, 1792, p. 142, pl. 5. Abbor slagtet.
- Bodianus sexlineatus* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1803, pp. 285, 302 (collection de Muséum national d'histoire naturelle).
- Centropomus sexlineatus* LACÉPÈDE, Hist. Nat. Poiss., vol. 5, 1802, pp. 688, 689 (East Indies).
- Grammistes sexlineatus* KLUNZINGER, Fische Roth. Meer., 1884, p. 10.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 346 (Zanzibar, Mauritius, Ceylon, Formosa, Philippines, Sumatra, Amboyna, Mysol, Australia, Solomons, Anciteum).—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 260, pl. 38, fig. 2 (Apia, Samoa).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 78 (Bacon).—REGAN, Journ. Linn. Soc. London, ser. 12, vol. 2, 1907, p. 224 (Salomon, Chagos Archipelago).—GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol. 6, 1908–11, p. 145 (Jetty Point; Durban, Natal).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 214 (Sanguisiapo, Sulu Archipelago; Pepela Bay, Rotti).—BEAUFORT, Bijl. Dierk., Amsterdam, 1913, p. 112 (Saonek, Waigiu).—PELLEGRIN, Bull. Soc. Zool. France, vol. 39, 1914, p. 224 (Fort Dauphin, Madagascar).—TANAKA, Fig. Descr. Fishes Japan, vol. 33, Aug. 14, 1924, p. 626, pl. 150, fig. 414 (Tanabe).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 9 (Guam).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 492 (Natal).—FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 187 (Marcus Island, Tahiti, Nukuhiva, Tubuai, Shortland Island, Guam, Apia, Society Islands, Ebon Island, Apiang, Ascension Island).
- Grammistes orientalis* SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 189. East Indies.—CUVIER, Hist. Nat. Poiss., vol. 2, 1828, p. 203, pl. 27 (East Indies, Neros Bankos).—GUERIN, Iconogr. Règne Animal, Poiss., 1829–44, p. 5, pl. 1, fig. 2 (East Indies).—PETERS, Arch. Naturg., 1855, p. 235 (Mozambique).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 171 (Mauritius, Philippines, Indian Ocean, Australia).—GUICHENOT, Notes Ile Réunion, vol. 2, 1862, p. 23.—PLAYFAIR, Fishes of Zanzibar, 1866, p. 14 (Zanzibar).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 707 (Koseir, Red Sea).—GÜNTHER, Cruise of Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas); Journ. Mus. Godeffroy, vol. 1, pt. 1, 1873, p. 10 (Tuamotus, Kingsmills).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 7, 1873–76, p. 670, pl. (59) 337, fig. 5 (Java, Sumatra, Batu, Celebes, Sangi, Halmahera, Ternate, Batjan, Flores, Buru, Ceram, Amboina, Goram, Aru, New Guinea, Philippines).—DAY, Fishes of India, pt. 1, 1875, p. 28, pl. 9, fig. 1 (Andamans).—PETERS, Monatsb. Akad. Wiss. Berlin, 1876, p. 436 (Mauritius).—MARTENS, Preuss. Exp. Ost-Asien, vol. 1, 1876, p. 386 (Muntok, Banka, Amboina River).—MEYER, Anal. Soc. Españ. Hist. Nat., Madrid, vol. 14, 1885, p. 9 (Kordo, Mysore).—DAY, Fauna Brit. India, vol. 1, 1889, p. 460, fig. 144 (Madras).—JATZOW and LENZ, Abh. Senckenberg. Naturf. Ges., vol. 21, 1889, p. 499 (Zanzibar; Aldabra).—ELERA, Cat. Fauna Filip., vol. 1, 1895, p. 464 (Luzon, Manila, Pangasinan, Sual).—WEBER, Semon's Zool. Forsch. Reis. Austral., vol. 5, 1895, p. 262 (Amboina).
- Labrax orientalis* STEINDACHNER, Anz. Akad. Wiss. Wien, vol. 32, No. 24–25, November 21, 1895, p. 259 (Suez).
- Sciaena vittata* LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 310, 316. Mauritius.

Perca triacantha LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 398, 424.

"Collection cédée à la France par la Hollande."

Perca pentacantha LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 398, 424.

"Collection cédée à la France par la Hollande."

Depth $2\frac{3}{5}$ to $3\frac{1}{8}$; head $2\frac{1}{4}$ to $2\frac{3}{4}$, width $1\frac{7}{8}$ to $2\frac{1}{5}$. Snout $4\frac{1}{2}$ in head from snout tip; eye 4 to 5, 1 to $1\frac{1}{4}$ in snout, greater than interorbital in young to $1\frac{1}{8}$ in interorbital with age; maxillary reaches $\frac{4}{5}$ in eye in young to little beyond eye with age, expansion $1\frac{1}{5}$ to $1\frac{1}{4}$ in eye, length 2 in head from snout tip; teeth fine, in bands in jaws, on vomer and palatines, none on tongue; interorbital $5\frac{1}{4}$ to $7\frac{1}{2}$, little convex; preopercle edge with 3 rather large spines; 3 opercular spines equidistant. Gill rakers 7 + 14, lanceolate, longest half of gill filaments or $2\frac{1}{4}$ in eye; 5 above and 7 below rudimentary.

Scales 59 in lateral line to caudal base and 7 more on latter; 14 rows above, 27 rows below, 20 rows on predorsal to occiput, 15 to 18 rows on cheek to preopercle angle; muzzle, maxillary and interorbital naked. Fins, except spinous dorsal, with small scales basally. Scales with 57 to 63 radiating striae; circuli moderately fine.

D. VII, 13, 1, second spine $2\frac{3}{5}$ to $3\frac{1}{3}$ in total head length, eighth ray 2 to $2\frac{1}{8}$; A. I, 9, 1, fourth ray 2 to $2\frac{1}{8}$; caudal $1\frac{1}{2}$ to $1\frac{2}{3}$, convex behind; least depth of caudal peduncle $2\frac{2}{5}$ to $2\frac{7}{8}$; pectoral $1\frac{3}{4}$ to $1\frac{4}{5}$; ventral 2 to $2\frac{1}{3}$.

Dark brown generally, with about 5 whitish broad longitudinal bands in young, which alternate and become narrow with age when about 8 are formed. These lines all variable and not quite the same on both sides of the same specimen. They are especially broken or variously disconnected on head. Fins uniformly pale brown.

Red Sea, Zanzibar, Natal, Madagascar, Mauritius, Seychelles, Ceylon, Andamans, East Indies, Philippines, Formosa, Japan, Australia, Melanesia, Micronesia, Polynesia. According to Bleeker the white longitudinal bands are 3 or 4 in the very young.

(768). Sablayan, Mindoro. December 13, 1908. Length 62 mm.

56264 U.S.N.M. Bacon, Philippines. Bureau of Fisheries (3750). Length 75 mm.

32727 U.S.N.M. Indian Archipelago. Leiden Museum. Length 150 mm.

52392 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 118 mm.

Genus PLESIOPS Oken

Plesiops OKEN, Isis, 1817, p. 1182 (on CUVIER, Règne Animal, vol. 2, 1817, p. 266, atypic). Type *Plesiops nigricans* RÜPPELL, designated by BLEEKER, Arch. Néerland. Sci. Nat. Haarlem, vol. 2, 1876, p. 322.

Pharopteryx RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 15. Type *Pharopteryx nigricans* RÜPPELL, monotypic.

Cirrhiptera (KÜHL and VAN HASSELT) BLEEKER, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 280. Type *Cirrhiptera corallicola* (VAN HASSELT) BLEEKER, monotypic. (Name in synonymy.)

Body well compressed. Mouth moderate, protractile. Maxillary exposed, with supplemental bone. Jaws with villiform teeth and

slightly enlarged conical teeth; bands of villiform teeth on vomer and palatines, tongue toothless. Preopercle and opercle entire, not armed with spines. Gill membranes separate. Gill rakers short, rather few. Pseudobranchiae present. Branchiostegals 6. Vertebrae 25, of which 15 caudal. Scales large, ciliated, spinulose. Lateral line in 2 sections; upper extends along back close to dorsal base, only reaching below last dorsal rays; lower section median on tail and reaches caudal; tubes straight, well exposed and form nearly continuous line. A single dorsal with 11 or 12 spines and 6 or 7 rays, the membrane deeply notched between spines or spinous portion thrice as long as soft. Anal short, with 3 spines and 8 or 9 rays. Caudal rounded. Pectoral short, rounded, upper rays longest, rays 20 or 21. Ventrals below pectorals, close together, with spine and 4 soft rays, first of which much thickened and bifid.

Indian and Western South Pacific Oceans.

ANALYSIS OF THE SPECIES

- a*¹. Head obtuse; large blue black ocellus on lower part of opercle.....*nigricans*
*a*². Head pointed; opercle without black spot.....*oxycephalus*

PLESIOPS NIGRICANS (Rüppell)

Pharopteryx nigricans RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 15, pl. 4, fig. 2. Mohila, Red Sea.—JORDAN and SEALE, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 260 (Apia and Pago Pago).—EVERMANN and SEALE, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 78 (Bacon).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 9 (Guam), p. 33 (Samoa); No. 38, 1927, p. 15 (Howland and Baker Islands); Mem. Bishop Mus., vol. 10, 1928, p. 188 (Shortland Island, Guam, Kingsmills, Ebon Island, Ponapé, Apia, Fiji).

Plesiops nigricans RÜPPELL, Neue Wirbelth., Fische, 1835, p. 5 (Red Sea).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 363 (copied).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 517 (Koseir, Red Sea).—DAY, Fishes of India, pt. 1, 1875, p. 128, pl. 31, fig. 5 (Andamans).—BLEEKER, Verh. Akad. Wet. Amsterdam, vol. 15, No. 5, 1875, p. 27, pl. 3, fig. 2 (Sumatra, Batu, Nias, Java, Bawean, Java, Bali, Solor, Flores, Timor, Celebes, Sangi, Ternate, Halmaheira, Ceram, Amboina, Goram, Waigiu, Luzon).—PETERS, Monatsb. Akad. Wiss. Berlin, 1876, p. 438 (Mauritius).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 9, 1877, pl. (1) 390, fig. 3.—KLUNZINGER, Fische Roth. Meer., 1884, p. 66.—VAILLANT, Bull. Soc. Philomath. Paris, ser. 8, vol. 1, 1889, p. 58 (Sumatra).—DAY, Fauna Brit. India, vol. 2, 1889, p. 19, fig.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 340 (Zanzibar, Ceylon, China, Andamans, Sumatra, Manado, Amboyna, Australia, East Australia, Fiji, Levuka, Tonga, Samoa, Savaii, Micronesia).—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 414 (Ternate).—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 13, 1907, p. 204 (Tulcar, Madagascar).—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 257 (Calayan).—REGAN, Journ. Linn. Soc. London, vol. 12, ser. 2, 1907, p. 224 (Coetivy, Seychelles Group).—GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol. 11, pt. 2, 1911, p. 37 (Natal).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 212 (Pidjot Bay, Lombok; Lirung; Sanana; Lucipara; Amboina; Nusa

- Laut; Tuir).—BEAUFORT, Bijd. Dierk. Amsterdam, 1913, p. 112 (Saonek, Waigiu).—BARNARD, Ann. South Afric. Mus., vol. 21, 1927, p. 494 (Natal coast).
- Plesiops coeruleo-lineatus* RÜPPELL, Neue Wirbelth., Fische, 1835, p. 5, pl. 2, fig. 5. Massaua.—PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 257 (Paracali, Luzon).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 517 (Koseir, Red Sea).
- Plesiops caeruleo-lineatus* GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 363 (Australia).
- Plesiops corallicola* (KÜHL) RÜPPELL, Neue Wirbelth., Fische, 1835, p. 5. Java Sea.—BLEEKER, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 282 (Priaman).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 364 (Moluccas, Amboyna, Fiji, Tonga, China).—KNER, Reise Novara, Zool., vol. 1, pt. 2, 1865, p. 214 (Madras).—GÜNTHER, Journ. Mus. Godeffroy, vols. 2-3, pts. 5-6, 1874, p. 87, pl. 58, fig. B (East Indies, Samoa, Tonga, Fiji, Pelew and Kingsmill Islands).—VAILLANT, Bull. Soc. Philomath. Paris, ser. 8, vol. 1, 1889, p. 58 (no locality).
- Cirripectera corallicola* (VAN HASSELT) BLEEKER, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 281 (name in synonymy).
- Pharyopteryx corallicola* FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 530 (Padang); Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 268 (Padang material); Copeia, No. 58, June 18, 1918, p. 63 (Philippines); Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 275 (Philippines).
- Plesiops melas* BLEEKER, Verh. Batav. Genootsch. (Bali), vol. 22, 1849, p. 9. Boleling, North Bali.—JORDAN and RICHARDSON, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 257 (Cayalan).—REGAN, Proc. Zool. Soc. London, 1909, pt. 1, p. 403 (Christmas Island, Indian Ocean).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 498 (Okinawa).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 213 (Sumba, Seba, Bco, Lirung, Atjatuning, Kubaena, Saleyer, Tuir, Timor, Rotti).—BEAUFORT, Bijd. Dierk., Amsterdam, 1913, p. 112 (Saonek, Waigiu).
- Pharopteryx melas* JORDAN and SEALE, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 781 (Negros); Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 261, pl. 38, fig. 3 (Apia and Pago Pago).—OGILBY, Mem. Queensland Mus., vol. 2, 1913, p. 84 (Masthead Island).
- Plesiops woodlarkensis* THIOLLIÈRE, Fauna Woodlark, 1857, p. 160. Woodlark Island.
- Plesiops nigricans* var. *apoda* KNER, Sitz. Ber. Akad. Wiss. Wien, vol. 57, pt. 1, 1868, p. 346. Savay, Samoa; Kandavu.
- Plesiops nakaharoe* TANAKA, Dobutsugaku Zasshi (Zool. Mag.), vol. 29, No. 345, July 15, 1917, p. 199. Province Ise (probably off Province Shima or Kiu).
- Pharopteryx nakaharae* TANAKA, Fig. Descript. Fishes Japan, vol. 28, Nov. 28, 1918, p. 497, pl. 137, fig. 383 (type).
- Plesiops semeion* TANAKA, Dobutsugaku Zasshi (Zool. Mag.), vol. 29, No. 345, July 15, 1917, p. 200. Tanabe, Province of Kiu.
- Pharopteryx semeion* TANAKA, Fig. Descript. Fishes Japan, vol. 28, Nov. 28, 1918, p. 500, pl. 137, fig. 382 (type).

Depth $2\frac{1}{3}$ to $2\frac{1}{2}$; head $2\frac{4}{5}$ to 3, width $1\frac{7}{8}$ to 2. Snout 5 in head from snout tip; eye $2\frac{4}{5}$ to $3\frac{1}{2}$, greater than snout or interorbital; maxillary reaches $\frac{1}{2}$ to $\frac{3}{5}$ in eye, expansion $1\frac{2}{3}$ to 2 in eye, length 2 to $2\frac{1}{4}$ in head from snout tip; teeth villiform, in bands in jaws, on

vomer and palatines; interorbital 4 to $4\frac{1}{4}$, slightly convex; preopercle edge entire. Gill rakers 5 + 9, lanceolate, some short and clavate, length $2\frac{2}{5}$ in eye.

Scales 19 or 20 in lateral line in upper section, 8 or 9 in lower section to caudal base and 3 more on latter; 3 scales above, 12 below, 11 predorsal to occiput, 3 rows on cheek to preopercle flange; 3 rows of scales along dorsals and anals and caudal base scaled; maxillary naked; scales with 8 basal radiating striae; sometimes few very feeble minute apical denticles; circuli very fine.

D. XI, 9, 1, eleventh spine $1\frac{1}{2}$ to $1\frac{2}{3}$ in total head length, sixth ray $2\frac{2}{3}$ to 3 in combined head and body to caudal base; A. III, 9, 1, third spine $1\frac{7}{8}$ to 2 in head, sixth ray $2\frac{1}{4}$ to $2\frac{1}{2}$ in combined head and body to caudal base, caudal $1\frac{1}{2}$ to $1\frac{4}{5}$; ends in long median point; least depth of caudal peduncle 2 in head; pectoral $1\frac{1}{10}$; ventral $1\frac{3}{4}$ to $2\frac{1}{3}$ in combined head and body to caudal base.

Dark brown, and at juncture of each scale row longitudinally on body dark or blackish band. Iris dark brown. Body and fins except pectoral which pale brown all with variable, scattered round brilliant white spots, all smaller than pupil. On last dorsal rays a large black white edged ocellus, large as eye. Ventral blackish like vertical fins and with small white spots.

Red Sea, Zanzibar, Natal, Madagascar, Seychelles, India, Ceylon, Andamans, East Indies, Philippines, China, Japan, Australia, East Australia, Melanesia, Micronesia, Polynesia. Quite variable, also color as well and minor structural variations frequent. Boulenger remarks "I have not been able to satisfy myself of the validity of the character pointed out by Vaillant for distinguishing *P. nigricans* from *P. corallicola*, as the material before me show it to be not even constant on the same individual. Professor Vaillant was probably deceived by examining isolated detached scales of the two supposed species." We fail likewise to find anything tangible to separate *P. nakaharae* and *P. semeion*.

35 examples. Batan Island. July 22, 1909. Length 20 to 53 mm.

11 examples. Batan Island. June 5, 1909. Length 18 to 60 mm.

17034 (1519). Bisucay Island, near Cuyo. April 9, 1909. Length 56 mm.

4635 (101). Bubuan Island. February 14, 1909. Length 59 mm.

(D. 5555.) Cabalian Point, Jolo. N. 50° W. 3.3 miles ($5^{\circ} 51' 15''$ N., $120^{\circ} 58' 35''$ E.), in 34 fathoms. September 18, 1909. Length 28 mm. (1951).

Twenty eight examples. Canimo Pass, near Daet. June 15, 1909. Length 38 to 76 mm.

Seven examples. Cataingan Bay, Masbate. April 18, 1908. Length 31 to 71 mm. (563, 564).

21099, 22372, 22373. Maculabo Island. June 14, 1909. Length 18 to 129 mm. (1661, 1665). 27 examples.

7314. Mantacao Island, west coast of Bohol. April 8, 1908. Length 44 mm.

Two examples. Mariveles Bay. September 22, 1908. Length 24 mm.

One example. Masongas Island. In coral head. October 2, 1908. Length 19 mm.

- One example. Masongas Island. October 10, 1908. Length 32 mm. (72).
 22191. Pangasinan Island, vicinity of Jolo. February 13, 1908. Length 70 mm.
 21579. Pilas Island. September 12, 1909. Length 22 to 65 mm. 4 examples.
 21002. Pujada Bay, Mindanao. May 15, 1908. Length 53 mm.
 Two examples. Ragay Bay. March 10, 1909. Length 28 mm.
 11617, 11618. Sablayan, Mindoro. December 12, 1908. Length 70 to 83 mm.
 2 examples.
 Six examples. Sablayan. December 13, 1908. Length 30 to 65 mm.
 20000. San Miguel Island. April 21, 1908. Length 62 mm.
 21916. Sirinao Island. December 31, 1908. Length 50 mm.
 22761. Sitanki Reef. September 24, 1909. Length 58 mm.
 20695. Ulugan Bay, near Bakeli River mouth, Palawan Island. December 28, 1908. Length 48 mm.
 Twelve examples. Tomahu Island, Bouro. December 12, 1909. Length 41 to 53 mm.
 Two examples. Togian Island, Togian Bay, Celebes. November 19, 1909. Length 58 to 60 mm. (2051).

PLESIOPS OXYCEPHALUS Bleeker

Plesiops oxycephalus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 8, 1855, p. 320. Batu Archipelago.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 364 (copied).—BLEEKER, Verh. Kon. Akad. Wet. Amsterdam, No. 5, vol. 15, 1875, p. 29, pl. 2, fig. 1 (Batu; Amboina); Atlas Ichth. Ind. Néerland., vol. 9, 1877, pl. (1) 389, fig. 7.—BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 341 (copied).

Only known from the East Indies. Not obtained since reported by Bleeker, he having but three examples.

Three examples. Tomahu Island, Bouro, Dutch East Indies. December 12, 1909. Length 60 to 62 mm. (2133).

CALLOPLESIOPS new genus¹⁵

Type.—*Calloplesiops niveus* new species.

Body robust, short. Head rather large. Snout short. Eye moderate. Mouth rather large, mandible protruding. Maxillary exposed, with supplemental bone. Teeth villiform. Preorbital narrow. Preopercle entire. Opercle unarmed. Gill rakers rather short, few. Lateral lines 2. Scales large, cteniod. Dorsal single with 11 spines and 9 rays, membranes not deeply notched between ends of spines, soft fin forming long elevated lobe. Anal with 3 spines and 9 rays, soft fin like soft dorsal. Caudal greatly elongated, greater than head, rounded. Pectoral short. Ventral very long.

Known from the East Indies and Philippines.

Diagnosis.—Though related to *Plesiops* quite unlike it in appearance, differing especially in the shorter body and enlarged soft vertical fins.

ANALYSIS OF THE SPECIES

- a¹. Cheek with 3 rows of scales; body and fins covered with moderately large white spots.....*niveus*
 a². Cheek with 2 rows of scales; body and fins covered with very fine or small white dots, on body one to each scale.....*argus*

¹⁵ ααλλος beautiful; *Plesiops*.

CALLOPLESIOPS NIVEUS new species¹⁹

Depth $2\frac{1}{5}$ to $2\frac{1}{2}$; head $2\frac{2}{3}$ to $2\frac{4}{5}$, width $1\frac{3}{5}$ to $1\frac{7}{8}$. Snout $4\frac{3}{4}$ to 5 in head from snout tip; eye 3 to $3\frac{2}{5}$, much greater than snout or interorbital; maxillary reaches $\frac{2}{3}$ to $\frac{3}{4}$ in eye, expansion $1\frac{4}{5}$ to 2 in eye, length 2 to $2\frac{1}{8}$ in head from snout tip; teeth villiform, in rather broad bands in jaws, on vomer, but none on tongue or on palatines; interorbital $3\frac{3}{4}$ to $4\frac{2}{3}$, slightly convex; preopercle entire. Gill rakers 3+9, of which all upper and 3 of lower rudiments; developed rakers robust and lanceolate, equal gill filaments or $2\frac{2}{3}$ in eye.

Tubes in lateral line 17 to 20+8 or 9+2 or 3, of which last on caudal base; 4 scales above lateral line, 11 below, 11 or 12 predorsal forward opposite middle of eye, 3 rows on cheek to preopercle ridge; muzzle and maxillary naked; dorsals and anals with basal scaly sheaths of large scales, caudal also with large scales. Upper section of lateral line very high on back, close along bases of dorsals and lower section midway along side of caudal peduncle. Scales with 9 basal radiating striae; apical denticles 50 to 85, with 4 to 8 series transversely, fine and small; circuli very fine.

D. XI, 9, I, last spine $1\frac{2}{5}$ to $1\frac{2}{3}$ in total head length, sixth ray $2\frac{1}{2}$ to $2\frac{3}{5}$ in combined head and body to caudal base; A. III, 9, I, seventh ray $2\frac{1}{3}$ to $3\frac{1}{8}$; caudal $1\frac{2}{5}$ to $1\frac{4}{5}$, greatly elongated or ellipsoid; ventral $1\frac{2}{3}$ to $2\frac{2}{5}$; third anal spine $1\frac{3}{4}$ to $1\frac{4}{5}$ in total head; least depth of caudal peduncle 2 to $2\frac{1}{8}$; pectoral 1.

Dark dusky brown generally. Dark longitudinal bands on body, each one at juncture of scales and wide as pale interspaces. Vertical fins and ventrals all blackish generally, pectorals uniform dull olive and in contrast with rest of coloration. Iris with radiating brownish blotches. Whole body, excepting pectoral though including iris, marked with scattered brilliant white round spots, evidently blue in life, and larger on body than on fins. On last dorsal rays large black ocellus nearly large as eye.

East Indies, Philippines. A very handsome fish with large vertical fins. The sexes are alike and the females apparently equally brilliant.

Type.—Cat. No. 89986, U.S.N.M.

Diagnosis. Known chiefly by its coloration, the body and fins covered with moderately large white spots.

21546. Bagaey Bay, Maranjós Grande. March 13, 1909. Length 148 mm.
17056. Bisueay Island, Cuyo. April 9, 1909. Length 120 mm.

5141, 21029. Little Santa Cruz Island, Zamboanga. May 28, 1908. Length 137 to 143 mm.

20533. Port Galera, Mindoro. October 27, 1909. Length 80 mm.

15347, 20436. Port Palapag. June 3, 1909. Length 108 to 151 mm.

One example. Romblon Reef. March 26, 1908. Length 110 mm. (497).

¹⁹ *Niteus*, snowy, with reference to the white spots.

15642. Sablayan, Mindoro. December 13, 1908. Length 89 mm.
 13946, 13947. Sabtan Island. November 8, 1908. Length 112 to 135 mm.
 17599. San Miguel Island, Tabaco Bay. June 7, 1909. Length 160 mm.
 8692. Tutu Bay, Jolo. September 19, 1909. Length 106 mm.
 21358. Limbe Strait, Celebes, Dutch East Indies. November 11, 1909. Length 117 mm.
 14395. Talisse Island. November 9, 1909. Length 115 mm.
 13058. Gomomo Island, Pitt Passage. December 3, 1909. Length 123 mm.
 (Type number U.S.N.M. 89986.)

CALLOPLESIOPS ARGUS, new species²⁰

Depth $2\frac{1}{3}$; head $2\frac{3}{4}$, width 2. Snout $4\frac{1}{2}$ in head from snout tip; eye 3, much greater than snout or interorbital; maxillary reaches three-fifths in eye, expansion 2 in eye, length $2\frac{1}{3}$ in head from snout tip; teeth villiform, in bands in jaws, on vomer and few on front of each palatine, tongue smooth; interorbital 4 in head from snout tip, slightly convex. Gill rakers 2 + 9, lanceolate, greatly longer than gill filaments or $3\frac{1}{2}$ in eye; 2 upper and lower rudiments.

Scales 18 + 7 + 2 in lateral lines, with last on caudal base; 5 scales above lateral line, 11 below, 11 predorsal forward nearly midway in interorbital, 2 rows on cheek to preopercle ridge; muzzle and maxillary naked; row of rather large scales form basal sheaths to dorsals and anals, and caudal base broadly scaly. Lateral line of simple tubes, upper section high along bases of dorsals on back and lower section midway on side of caudal peduncle. Scales with 7 basal radiating striae; about 40 small apical denticles with 9 series transversely; circuli very fine.

D. XI, 9, 1, last spine $1\frac{3}{5}$ in total head, seventh ray $2\frac{1}{5}$ in combined head and body to caudal base; A. III, 9, 1, third anal spine $2\frac{3}{5}$ in total head length, seventh ray $2\frac{1}{5}$; caudal $1\frac{2}{3}$, elongate, ovoid in contour; ventral $1\frac{1}{2}$; least depth of caudal peduncle $2\frac{1}{8}$; pectoral $1\frac{1}{8}$.

Rather dark uniform brownish generally, without any dark longitudinal bands. Body and fins everywhere, except pectorals, marked with very fine or small blue gray dots, one on each scale exposure, at rather even intervals on body, though on fins they form longitudinal gray lines or streaks terminally. All vertical fins and ventrals much darker than body. Iris dark brown, with radiating light lines. Pectoral uniform pale brown.

Only known from the type described above and quite different from *Culloplesiops niveus* in its fine blue white dots.

Diagnosis.—Known by the body and fins covered with very fine or small white dots, on body one to each scale.

22695. Gane Road, Gillolo Island, Dutch East Indies. December 1, 1909. Length 93 mm. (Type number U.S.N.M. 89987), (22695).

²⁰ *Argus*, with reference to the numerous pale dots.

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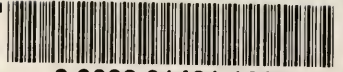
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